Manual No. '09 • KX-T-139
updated July 08, 2014

MHI

TECHNICAL MANUAL

VRF INVERTER MULTI-SYSTEM AIR CONDITIONERS

High Head Models (100m) cooling only

(OUTDOOR UNIT)

• Single use (Used also for combination)

FDCH335CKXE6G-K※, 400CKXE6G, 450CKXE6G, 504CKXE6G, 560CKXE6G, 560CKXE6G-K※, 615CKXE6G, 680CKXE6G

※FDC335KXE6G-K&FDC560KXE6G-K are only used for combining with other models.

• Combination use

FDCH735CKXE6G, 800CKXE6G, 850CKXE6G, 900CKXE6G, 960CKXE6G, 1010CKXE6G, 1065CKXE6G, 1130CKXE6G, 1180CKXE6G, 1235CKXE6G, 1300CKXE6G, 1360CKXE6G

In this Technical Manual,the High Head Models of outdoor units only are shown. Regarding the standard models please see the Manual No. '09 • KX-DB-127 (Data Book) and Manual No.'09-KX-SM-128 (Service Manual)

Service code

Outdoor unit	History of service code				Changes
FDCH335CKXE6G-K ≀ FDCH1360CKXE6G	blank	D	−	−	blank→D Transfer production place from Japan to Thailand

Page

Service code	Specifications / Exterior dimentions / Electric wiring
blank	P4～8
D	P60～64

Except Specifications, Exterior dimentions and Electrical wiring, this technical manual can be applied for all service code.

MITSUBISHI HEAVY INDUSTRIES, LTD.

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1 GENERAL INFORMATION

1.1 Specific features

(1) The R410A refrigerant is used.

The refrigerant R410A, with an ozone destruction coefficient of zero, is used and the CO_2 discharge volume is reduced, In addition, R410A is a pseudo-azeotropic refrigerant, so there is little change in its consistency that would cause it to divide into the gas and liquid phases, or undergo temperature slide, and it is also possible to add refrigerant on-site.

(2) Height difference from 50m to 100m.

Maximum allowable height difference between the outdoor and the indoor unit located at the lowest height position has been increased from 50m to 100m.(1) (When the outdoor unit is located at higher position than the indoor unit)

Note (1) In case of less than 50m, the standard models are applied.

(3) Connectable indoor capacity.

(a) Capacity from 50% to 200% is possible.

Item / Model	Number of connectable	Connectable capacity (2)
FDCH400CKXE6G	1 to 36 units	200 ~ 800
FDCH450CKXE6G	1 to 40 units	225 ~ 900

Note (2) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW Series, limit the connectable capacity not higher than 130%.

(b) Capacity from 50% to 160% is possible.

Item / Model	Number of connectable	Connectable capacity(2)
FDCH504CKXE6G	1 to 36 units	252 ~ 806
FDCH560CKXE6G	1 to 40 units	280 ~ 896
FDCH615CKXE6G	2 to 44 units	308 ~ 984
FDCH680CKXE6G	2 to 49 units	340 ~ 1088
FDCH735CKXE6G	2 to 53 units	368 ~ 1176
FDCH800CKXE6G	2 to 58 units	400 ~ 1280
FDCH850CKXE6G	2 to 61 units	425 ~ 1360
FDCH900CKXE6G	2 to 65 units	450 ~ 1440
FDCH960CKXE6G	2 to 69 units	477 ~ 1526

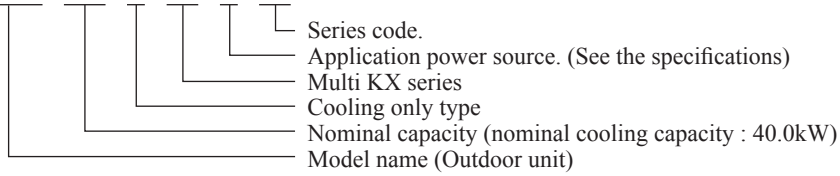
Note (2) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW Series, limit the connectable capacity not higher than 130%.

(c) Capacity from 50% to 130% is possible.

Item / Model	Number of connectable	Connectable capacity
FDCH1010CKXE6G	2 to 59 units	504 ~ 1311
FDCH1065CKXE6G	2 to 62 units	532 ~ 1384
FDCH1130CKXE6G	2 to 66 units	560 ~ 1456
FDCH1180CKXE6G	3 to 69 units	588 ~ 1528
FDCH1235CKXE6G	3 to 72 units	615 ~ 1599
FDCH1300CKXE6G	3 to 76 units	650 ~ 1690
FDCH1360CKXE6G	3 to 80 units	680 ~ 1768

1.2 How to read the model name

Example: **FDCH 400 C KX E 6G**


Series code.
Application power source. (See the specifications)
Multi KX series
Cooling only type
Nominal capacity (nominal cooling capacity : 40.0kW)
Model name (Outdoor unit)

1.3 Table of models

Model \ Capacity	22	28	36	45	56	71	90	112	140	160	224	280
Ceiling cassette-4 way type (FDT)		○	○	○	○	○	○	○	○	○		
Ceiling cassette-4 way compact type (FDTC)	○	○	○	○	○							
Ceiling cassette-2 way type (FDTW)		○		○	○	○	○	○	○			
Ceiling cassette-1 way type (FDTS)				○		○						
Ceiling cassette-1 way compact type (FDTQ)	○	○	○									
Duct connected-High static pressure type (FDU)						○	○	○	○		○	○
Duct connected-Middle static preessure type (FDUM)	○	○	○	○	○	○	○	○	○			
Duct connected (Ultra thin)-Low static preessure type (FDQS)	○	○	○	○	○							
Wall-mounted type (FDK)	○	○	○	○	○	○						
Ceiling suspen ded type (FDE)			○	○	○	○		○	○			
Floor standing (with casing) type (FDFL)						○						
Floor standing (without casing) type (FDFU)		○		○	○	○						
Floor standing-2 way type (FDFW)		○		○	○							
Duct connected-compact and Flexible type (FDUH)	○	○	○									
Outdoor units to be combined (FDC)	FDCH335CKXE6G-K, FDCH400CKXE6G ~ 560CKXE6G FDCH560CKXE6G-K, FDCH615CKXE6G ~ 1360CKXE6G											

1.4 Table of indoor units panel (Option)

Model		Parts Model
FDTC	Capacity:22,28,36,45,56	TC-PSA-25W-E
FDT	Capacity:28,36,45,56,71, 90,112,140,160	T-PSA-36W-E
FDTW	Capacity:28,45,56	TW-PSA-24W-E
	Capacity:71,90	TW-PSA-34W-E
	Capacity:112,140	TW-PSA-44W-E
FDTQ (Direct blow panel)	Capacity:22,28,36	TQ-PSA-15W-E
		TQ-PSB-15W-E
FDTQ (Duct panel)	Capacity:22,28,36	QR-PNA-14W-ER
		QR-PNB-14W-ER
FDTS	Capacity: 45	TS-PSA-29W-E
	Capacity:71	TS-PSA-39W-E

1.5 Outdoor units combination table

(a) Models FDCH735, 800, 850, 900CKXE6G

Item / Models	Combination outdoor unit models				Indoor unit	
	FDCH335 CKXE6G-K	FDCH400 CKXE6G	FDCH450 CKXE6G	FDCH504 CKXE6G	Connectable (1) capacity	Number of connectable units
FDCH735CKXE6G	1	1	—	—	368 ~ 1176	2 to 53 unit
FDCH800CKXE6G	—	2	—	—	400 ~ 1280	2 to 58 unit
FDCH850CKXE6G	—	1	1	—	425 ~ 1360	2 to 61 unit
FDCH900CKXE6G	—	—	2	—	450 ~ 1440	2 to 65 unit
FDCH960CKXE6G	—	—	1	1	477 ~ 1526	2 to 69 unit

Note (1) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW Series, limit the connectable capacity not higher than 130%.

(b) Models FDCH960, 1010, 1065, 1130, 1180, 1235, 1300, 1360CKXE6G

Item / Models	Combination outdoor unit models					Indoor unit	
	FDCH504 CKXE6G	FDCH560 CKXE6G	FDCH560 CKXE6G-K	FDCH615 CKXE6G	FDCH680 CKXE6G	Connectable capacity	Number of connectable units
FDCH1010CKXE6G	2	—	—	—	—	504 ~ 1311	2 to 59 unit
FDCH1065CKXE6G	1	1	—	—	—	532 ~ 1384	2 to 62 unit
FDCH1130CKXE6G	—	2	—	—	—	560 ~ 1456	2 to 66 unit
FDCH1180CKXE6G	—	—	1	1	—	588 ~ 1528	3 to 69 unit
FDCH1235CKXE6G	—	—	—	2	—	615 ~ 1599	3 to 72 unit
FDCH1300CKXE6G	—	—	—	1	1	650 ~ 1690	3 to 76 unit
FDCH1360CKXE6G	—	—	—	—	2	680 ~ 1768	3 to 80 unit

(c) Outdoor unit side branch pipe set (Option)

Outdoor unit	Branch pipe set
For two units (for FDCH 735CKXE6G ~ 1360CKXE6G)	DOS-2A-1

Note (1) Be sure to use this when combining units.

(d) Branch pipe set (Option)

Total capacity downstream	Branching pipe set
Less than 180	DIS-22-1
180 or more but less than 371	DIS-180-1
371 or more but less than 540	DIS-371-1
540 or more	DIS-540-2

(e) Header pipe set (Option)

Total capacity downstream	Header set model type	Number of branches
Less than 180	HEAD4-22-1	4 branches at the most
180 or more but less than 371	HEAD6-180-1	6 branches at the most
371 or more but less than 540	HEAD8-371-1	8 branches at the most
540 or more	HEAD8-540-2	8 branches at the most

2 OUTDOOR UNIT

2.1 Specifications

• Single use (Used also for combination)

Models			FDCH335CKXE6G-K	FDCH400CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G	FDCH560CKXE6G	FDCH560CKXE6G-K	FDCH615CKXE6G	FDCH680CKXE6G
Nominal cooling capacity*1		kW	33.5	40.0	45.0	50.4	56.0	56.0	61.5	68.0
Nominal heating capacity*2			–	–	–	–	–	–	–	–
Power source			3 Phase 380–415V 50Hz/380V 60Hz							
Power consumption	Cool	kW	8.94	11.27	12.97	14.73	16.79	16.79	20.37	24.98
	Heat		–	–	–	–	–	–	–	–
Running current	Cool	A	14.5/13.3	18.4/16.9	21.1/19.3	24.1/22.0	27.4/25.1	27.4/25.1	33.1/30.3	40.3/36.9
	Heat		–	–	–	–	–	–	–	–
Power factor		%	94/94	93/93	93/93	93/93	93/93	93/93	94/94	94/94
Sound Pressure Level		dB(A)	59/–	59.5/–	62.5/–	61.5/–	63/–	63/–	64.5/–	65/–
Exterior dimensions Height x Width x Depth		mm	1690×1350×720			2048×1350×720				
Net weight		kg	319			343		357		
Refrigerant equipment compressor type & Q'ty			GTC5150NH48LX2					GTD5160NH48LX2		
Motor		kW	2.99×2	3.71×2	4.29×2	4.87×2	5.78×2		6.66×2	7.15×2
Starting method			Direct line starting							
capacity control		%	19–130	15–114	13–112	11–100	10–113	12–113	11–110	10–108
Crankcase heater		W	33×2							
Refrigerant equipment Heat exchanger			Straight fin & inner grooved tubing							
Refrigerant control			Electronic expansion valve							
Refrigerant			R410A							
Quantity		kg	11.5							
Refrigerant oil		l	4.2 (M-MA32R)							
Defrost control			Microcomputer controlled De-Icer							
Air handling equipment fan type & Q'ty			Propeller fan × 2							
Motor		W	386×2							
Starting method			Direct start							
Air flow (Standard)		CMM	220/–	250/–	260/–	270/–				
External static pressure		Pa	Max 50							
Shock & vibration absorber			Rubber mount (for compressor)							
safety equipment			Compressor overheat protection / overcurrent protection / power transistor overheating protection / abnormal high pressure protection							
Installation data		mm (in)	Liquid line : φ12.7 (1/2")			Liquid line : φ15.88 (5/8")				
Refrigerant piping size			Gas line : φ25.4 (1")		Gas line : φ28.58 (11/8")					
Connecting method			Gas line : Brazing / Liquid line : Flare							
MAX. Pressure		MPa	High 4.15 Low 2.21							
Drain			Hole for drain (φ20 × 6pcs , φ45 × 3pcs)							
Insullation for piping			Necessary (both Liquid & Gas lines)							
Accessories			–	–	–	–	–	–	–	–

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
Operation	DB	WB	DB	WB	
Cooling*1	27 ℃	19 ℃	35 ℃	24 ℃	ISO-T1
Heating*2	20 ℃	–	7 ℃	6 ℃	

Adapted to RoHS directive

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

PCB003Z138A

'09•KX-T-139

Models			FDCH735CKXE6G	FDCH800CKXE6G	FDCH850CKXE6G	FDCH900CKXE6G	FDCH960CKXE6G	FDCH1010CKXE6G
Combination unit			FDCH335CKXE6G-K	FDCH400CKXE6G	FDCH400CKXE6G	FDCH450CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G
			FDCH400CKXE6G	FDCH400CKXE6G	FDCH450CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G	FDCH504CKXE6G
Power source			3 Phase 380–415V 50Hz/380V 60Hz					
Nominal cooling capacity*1		kW	73.5	80.0	85.0	90.0	96.0	101.0
Nominal heating capacity*2			–	–	–	–	–	–
Power consumption	Cool	kW	20.21	22.54	24.24	25.94	27.7	29.46
	Heat		–	–	–	–	–	–
Running current	Cool	A	32.9/30.2	36.8/33.8	39.5/36.2	42.2/38.6	45.2/41.3	48.2/44
	Heat		–	–	–	–	–	–
Power factor		%	93/93	93/93	93/93	93/93	93/93	93/93
Net weight		kg	638	638	638	638	662	686
Refrigerant piping size	Liquid line	ϕmm	ϕ19.05					
	Gas line		ϕ31.75					
	Oil equalization		ϕ9.52					

Models			FDCH1065CKXE6G	FDCH1130CKXE6G	FDCH1180CKXE6G	FDCH1235CKXE6G	FDCH1300CKXE6G	FDCH1360CKXE6G
Combination unit			FDCH504CKXE6G	FDCH560CKXE6G	FDCH560CKXE6G-K	FDCH615CKXE6G	FDCH615CKXE6G	FDCH680CKXE6G
			FDCH560CKXE6G	FDCH560CKXE6G	FDCH615CKXE6G	FDCH615CKXE6G	FDCH680CKXE6G	FDCH680CKXE6G
Power source			3 Phase 380–415V 50Hz/380V 60Hz					
Nominal cooling capacity*1		kW	106.5	113.0	118.0	123.5	130.0	136.0
Nominal heating capacity*2			–	–	–	–	–	–
Power consumption	Cool	kW	31.52	33.58	37.16	40.74	45.35	49.96
	Heat		–	–	–	–	–	–
Running current	Cool	A	51.5/47.1	54.8/50.2	60.5/55.4	66.2/60.6	73.4/67.2	80.6/73.8
	Heat		–	–	–	–	–	–
Power factor		%	93/93	93/93	93/93	94/94	94/94	94/94
Net weight		kg	686	686	714	714	714	714
Refrigerant piping size	Liquid line	ϕmm	ϕ22.22					
	Gas line		ϕ38.1					
	Oil equalization		ϕ9.52					

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation	27 ℃	19 ℃	35 ℃	24 ℃	ISO-T1
Cooling*1	20 ℃	-	7 ℃	6 ℃	
Heating*2					

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Adapted to RoHS directive

PCB003Z138 A

'09•KX-T-139

2.2 Exterior dimensions

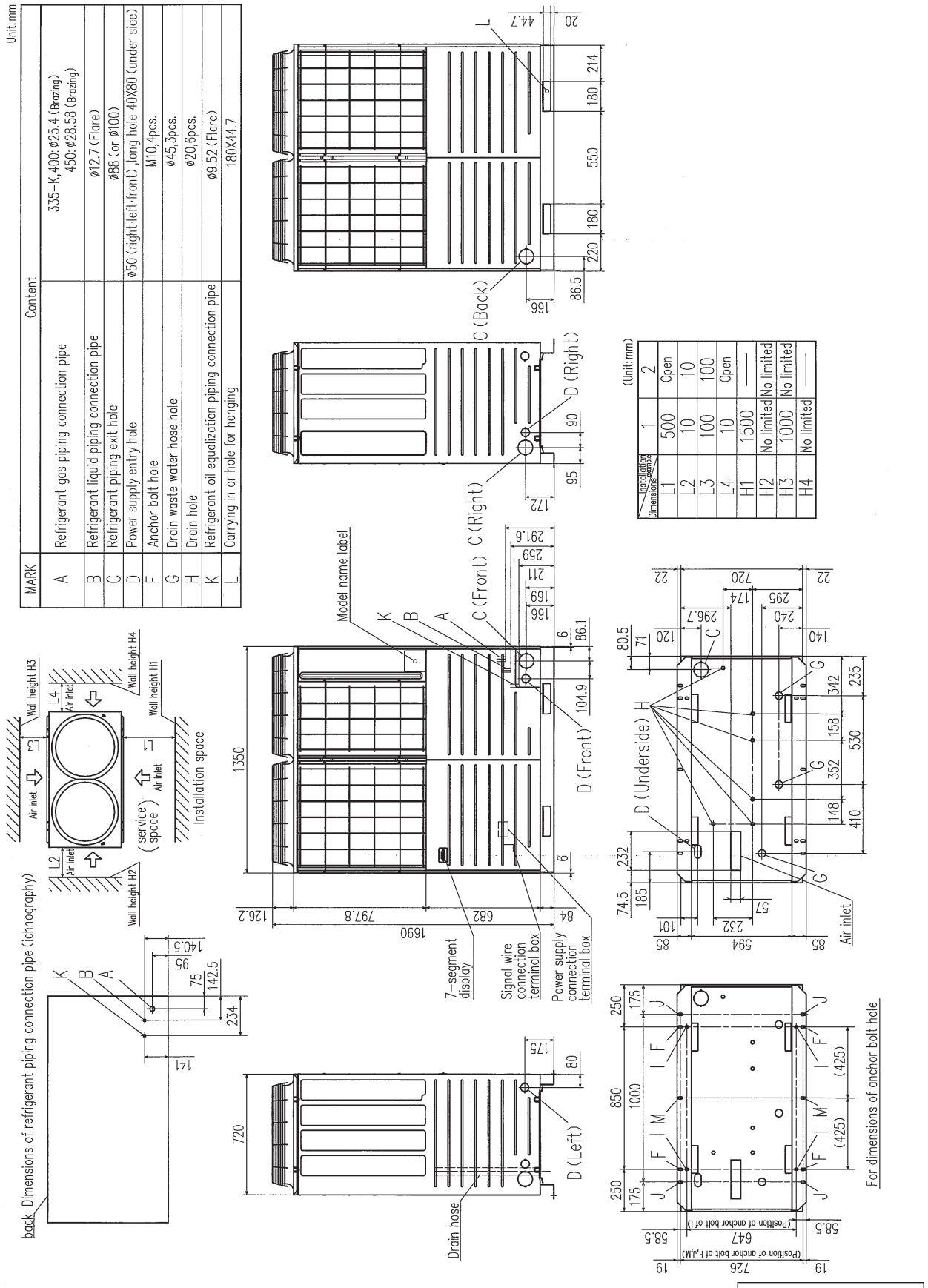
Models FDCH335CKXE6G-K, 400CKXE6G, 450CKXE6G

Unit: mm

MARK	Content	
A	Refrigerant gas piping connection pipe	335–K, 400: ø25.4 (Brazing) 450: ø28.58 (Brazing)
B	Refrigerant liquid piping connection pipe	ø12.7 (Flare)
C	Refrigerant piping exit hole	ø88 (or ø100)
D	Power supply entry hole	ø50 (right left front), long hole 40X80 (under side)
F	Anchor bolt hole	M10, 4pcs.
G	Drain waste water hose hole	ø45, 3pcs.
H	Drain hole	ø20, 6pcs.
K	Refrigerant oil equalization piping connection pipe	ø9.52 (Flare)
L	Carrying in or hole for hanging	180X44.7

(Unit: mm)

Installation Dimensions Example	1	2
L1	500	Open
L2	10	10
L3	100	100
L4	10	Open
H1	1500	——
H2	No limited	No limited
H3	1000	No limited
H4	No limited	——



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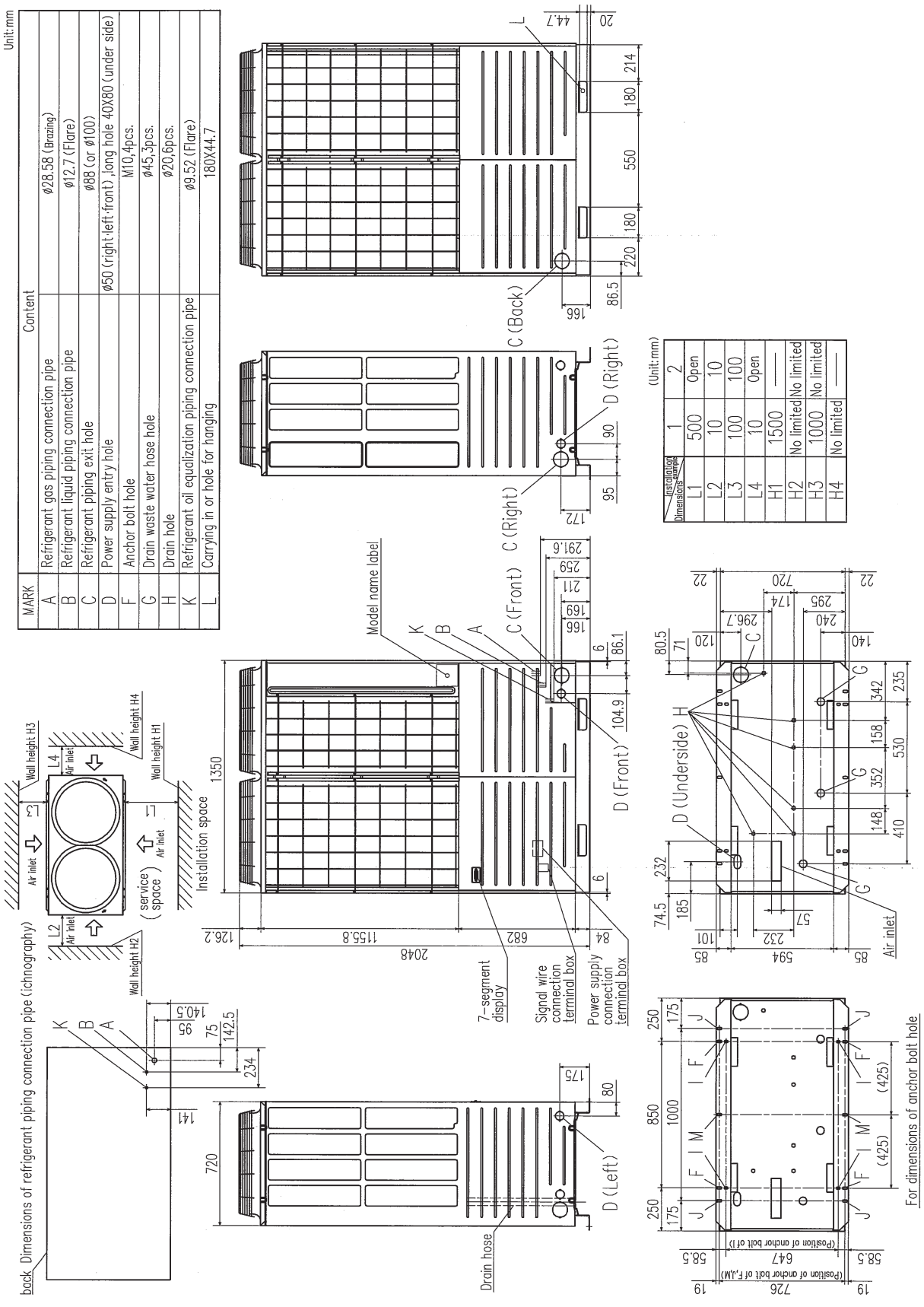
Models FDCH504CKXE6G, 560CKXE6G, 560CKXE6G-K, 615CKXE6G, 680CKXE6G

Unit: mm

MARK	Content	
A	Refrigerant gas piping connection pipe	ø28.58 (brazing)
B	Refrigerant liquid piping connection pipe	ø12.7 (Flare)
C	Refrigerant piping exit hole	ø88 (or ø100)
D	Power supply entry hole	ø50 (right·left·front) ,long hole 40X80 (under side)
F	Anchor bolt hole	M10,4pcs.
G	Drain waste water hose hole	ø45,3pcs.
H	Drain hole	ø20,6pcs.
K	Refrigerant oil equalization piping connection pipe	ø9.52 (Flare)
L	Carrying in or hole for hanging	180X44.7

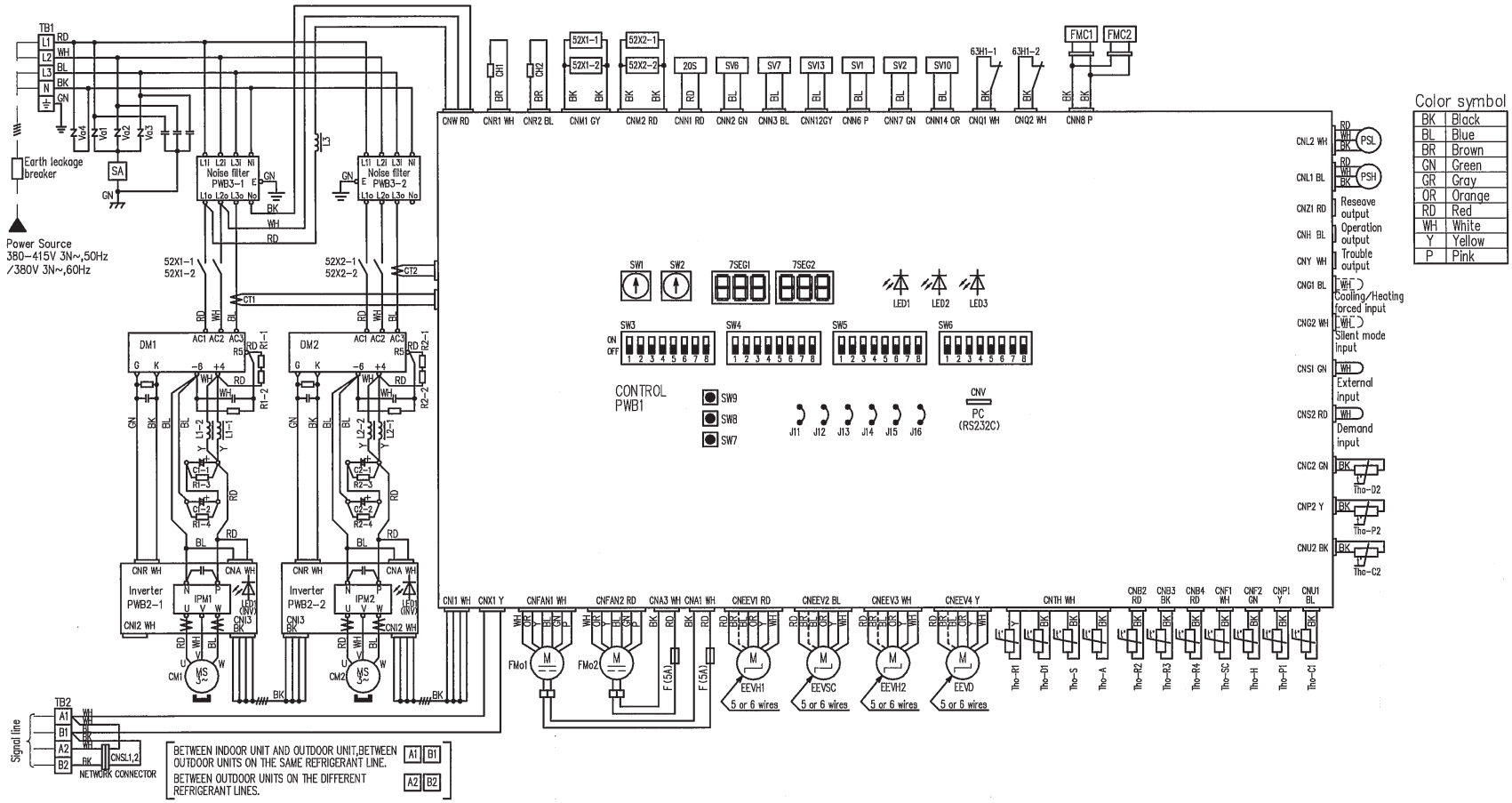
(Unit: mm)

Installation Dimensions example	1	2
L1	500	Open
L2	10	10
L3	100	100
L4	10	Open
H1	1500	——
H2	No limited	No limited
H3	1000	No limited
H4	No limited	——



2.3 Electrical wiring

Models All model



Color symbol

BK	Black
BL	Blue
BR	Brown
GN	Green
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
P	Pink

CH1,2	Crankcase heater
CM1,2	Compressor motor
CNA–Z	Connector
CT1,CT2	Current sensor
C1–1,2,C2–1,2	Electrolytic capacitor
DM	Diode module
EEVH1,2	Expansion valve for heating
EEVSC	Expansion valve for SC
EEVD	Expansion valve for decompression
F	Fuse
FMC1,2	Fan for IPM
FMo1,2	Blower motor
IPM	Intelligent power module
J11,12	Set up model (volt)
J13	External input select level/pulse
J14	Defrost recover temp
J15	Defrost start temp
J16	Heat recovery unit
LED1	Inspection (Red)
LED1 (INV)	Normal (Yellow) –Flashing
LED2	Normal (Green)
LED3	Service (green for service)
L1–1,2,L2–1,2	D.C.reactor
L3	D.C.reactor

PSH		High pressure sensor
PSL		Low pressure sensor
PWB1~3		Printed wiring board (PCB)
R1,2		Rush current suppression resistor
SA		Arrestor
SV1		Solenoid valve (CM1: bypass)
SV2		Solenoid valve (CM2: bypass)
SV6		Solenoid valve (oil separator CM1)
SV7		Solenoid valve (oil separator CM2)
SV10		Solenoid valve (decompression)
SV13		Solenoid valve (gas bypass)
SW1		Address setting SW outdoor unit No. (2 digits)
SW2		Address setting SW outdoor unit No. (1 digit)
SW3–1		inspection LED reset
SW3–2	ON	Auto backup operation
	OFF	Regular operation
SW3–3		Spare
SW3–4	ON	Refrigerant quantity check
	OFF	Regular operation
SW3–5	ON	Check operation
	OFF	Regular operation
SW3–6		Spare
SW3–7	ON	Forced cooling/heating
	OFF	Regular operation

SW3–8	ON	Test mode
	OFF	Regular operation
SW4–1~4		Model setting
SW4–5		Demand
SW4–6		Demand
SW4–7		Address setting switch (master・slave)
SW4–8		Address setting switch (master・slave)
SW5–1	ON	Trial operation
	OFF	Regular operation
SW5–2	ON	Trial operation mode/cooling
	OFF	Trial operation mode/heating
SW5–3	ON	Pump down operation
	OFF	Regular operation
SW5–4		Spare
SW5–5	ON	Super Link communication
	OFF	Super Link Ⅱ communication
SW5–6~8		Spare
SW6–1~3		Spare
SW6–4	ON	High head mode
	OFF	Regular operation
SW6–5~8		Spare
SW7		Data clear/insert
SW8		7seg indicate (unit's place)
SW9		7seg indicate (ten's place)

SW10	Reset
TB1,2	Terminal block
Tho–A	External air thermistor
Tho–C1,2	Under–dome thermistor
Tho–D1,2	Discharge pipe thermistor
Tho–H	Sub–cooling coil thermistor 2
Tho–P1,2	Power transistor thermistor
Tho–R1	Heat exchanger thermistor (exhaust)
Tho–R2	Heat exchanger thermistor (exhaust)
Tho–R3	Heat exchanger thermistor (inlet)
Tho–R4	Heat exchanger thermistor (inlet)
Tho–S	Suction pipe thermistor
Tho–SC	Sub–cooling coil thermistor 1
Va1~4	Varistor
20S	4way valve
52X1–1,2	Solenoid for CM1
52X2–1,2	Solenoid for CM2
63H1–1,2	High pressure switch (for protection)
7SEG1	7seg L.E.D. (function indication)
7SEG2	7seg L.E.D. (data indication)

PCB003Z139

2.4 Noise level

Measured based on JIS B 8616

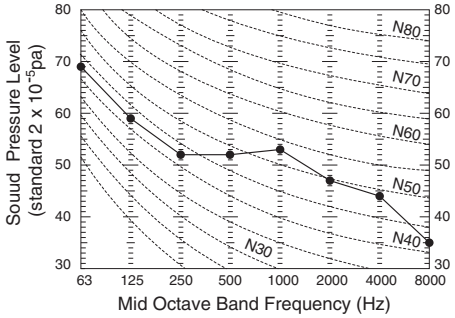
Mike position as highest noise level in position as below

Distance from front side 1m

Height 1m

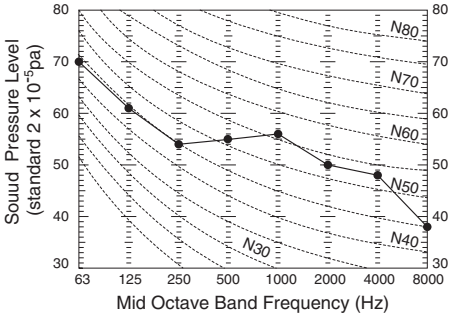
Model FDCH335CKXE6G-K

Noise level 59 dB (A)



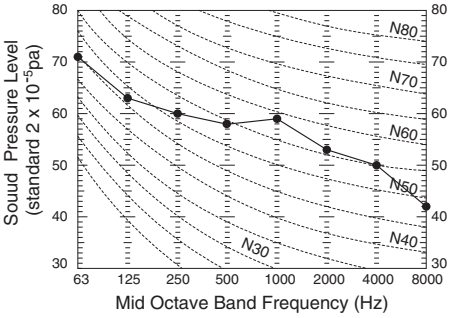
Model FDCH400CKXE6G

Noise level 59.5 dB (A)



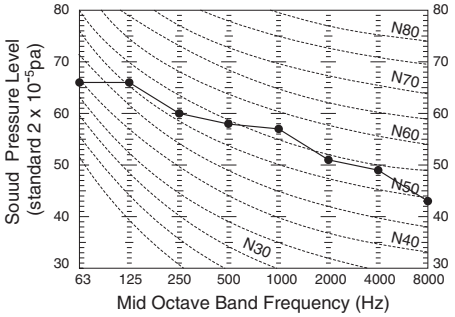
Model FDCH450CKXE6G

Noise level 62.5 dB (A)



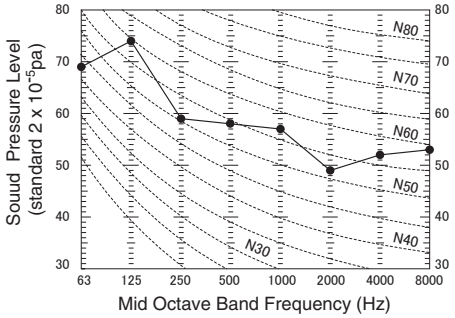
Model FDCH504CKXE6G

Noise level 61.5 dB (A)



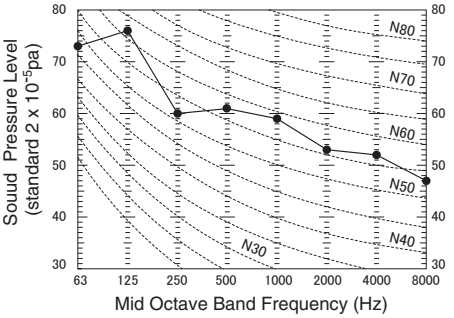
Models FDCH560CKXE6G
560CKXE6G-K

Noise level 63 dB (A)



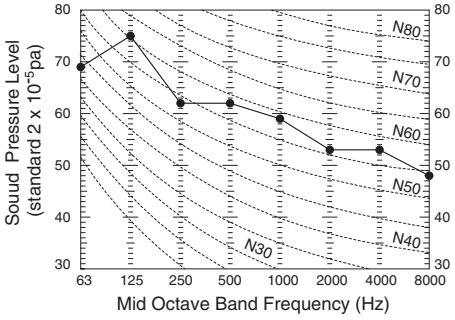
Model FDCH615CKXE6G

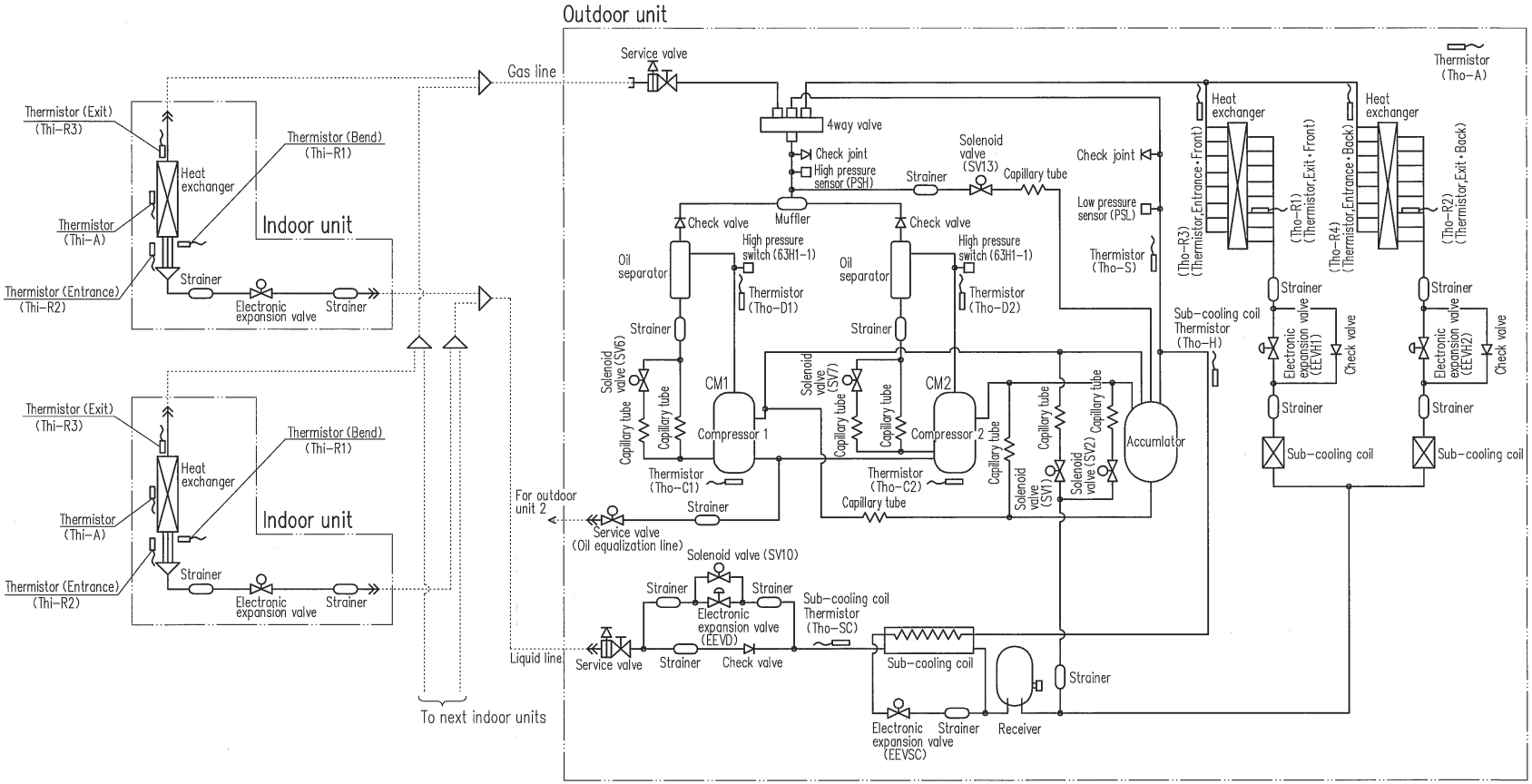
Noise level 64.5 dB (A)



Model FDCH680CKXE6G

Noise level 65 dB (A)





Notes (1) Preset point of protective deviees
63H1-1 : Open 4.15MPa, Close 3.15MPa
(For protection)

(2) Function of thermistor
PSH : For compressor control
Cooling: 3.70 ON (MPa)
PSL : ON 0.18MPa, OFF 0.20MPa
(For compressor control)
ON 0.134MPa, OFF 0.18MPa
(For protection)

Th_I-R1, R2 : Cooling operation : Frost prevention control.
Super heat control.
Th_I-R3 : For super heat control of cooling operation.
Tho-D : For control of discharge pipe temperature.
Tho-C : For control of temperarure under the dome.
Tho-S : For control of suction pipe temperature.
Tho-SC : Electronic expansion valve (EEVSC) control of cooling operation.
Tho-H : For super heat control of sub-cooling coil.

PCB003Z140

'09•KX-T-139

4 RANGE OF USAGE & LIMITATIONS

• Single use (also for combined use)

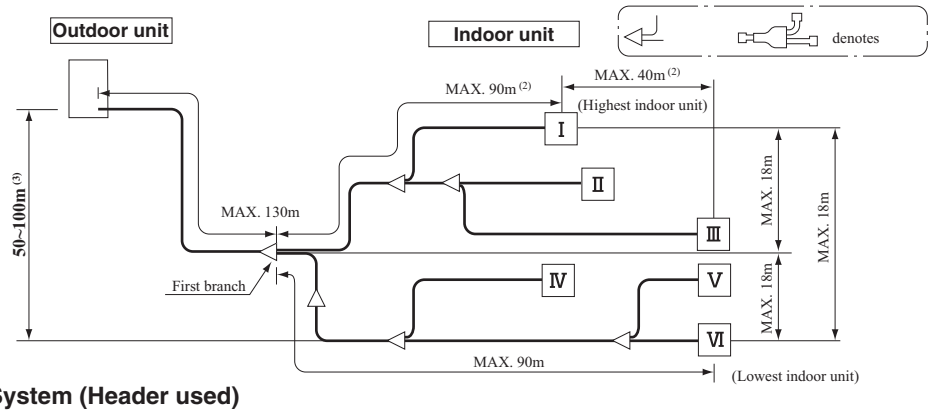
Item \ System		FDCH400CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G
Indoor air temperature (Upper, lower limits)		Refer to page 15		
Outdoor air temperature (Upper, lower limits)				
Indoor units that can be used in combination	Number of connected units	1 to 36 unit	1 to 40 unit	1 to 36 unit
	Connectable capacity (1)	200 ~ 800	225 ~ 900	252 ~ 806
Total piping length (2)		1000m or less		
Main pipe length		130m or less		
Single direction piping length		Actual length : 160m or less, Eguivalent length : 185m or less		
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less)		
Elevation difference between the first branching point and the indoor unit		18m or less		
Difference in height between indoor and outdoor units	Outdoor unit is higher	50 ~100m(3)		
	Outdoor unit is lower	Prohibited activity		
Difference in the elevation of indoor units in a system		18m or less		
Indoor unit atmosphere (behind ceiling) temperature and humidity (Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDQS, FDUH)		Dew point temperature 28 ℃ or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23℃ or less, relative humidity 80% or less)		
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop to start)		
	Stop time	3 min or more		
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage		
	Voltage drop during start	Within ±15% of rated voltage		
	Phase unbalance	Within ±3% of rated voltage		

Item \ System		FDCH560CKXE6G	FDCH615CKXE6G	FDCH680CKXE6G
Indoor air temperature (Upper, lower limits)		Refer to page15		
Outdoor air temperature (Upper, lower limits)				
Indoor units that can be used in combination	Number of connected units	1 to 40 unit	2 to 44 unit	2 to 49 unit
	Connectable capacity (1)	280 ~ 896	308 ~ 984	340 ~ 1088
Total piping length (2)		1000m or less		
Main pipe length		130m or less		
Single direction piping length		Actual length : 160m or less, Eguivalent length : 185m or less		
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less)		
Elevation difference between the first branching point and the indoor unit		18m or less		
Difference in height between indoor and outdoor units	Outdoor unit is higher	50~100m(3)		
	Outdoor unit is lower	Prohibited activity		
Difference in the elevation of indoor units in a system		18m or less		
Indoor unit atmosphere (behind ceiling) temperature and humidity (Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDQS, FDUH)		Dew point temperature 28 ℃ or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23℃ or less, relative humidity 80% or less)		
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop to start)		
	Stop time	3 min or more		
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage		
	Voltage drop during start	Within ±15% of rated voltage		
	Phase unbalance	Within ±3% of rated voltage		

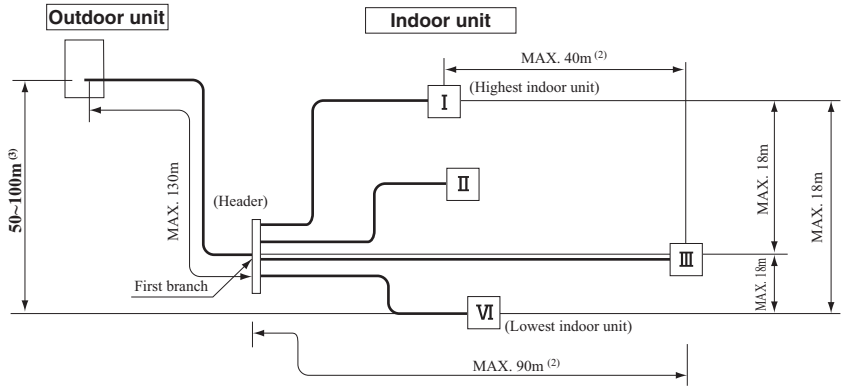
Note (1) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW (not yet) Series, limit the connectable capacity not higher than 130%.
(2) When the pipe extension length exceeds 510 m, additional refrigerant oil must be charged (1,000 cc).
(3) In case of less than 50m, the standard models are applied.

Allowable length of refrigerant piping, height difference between indoor and outdoor unit

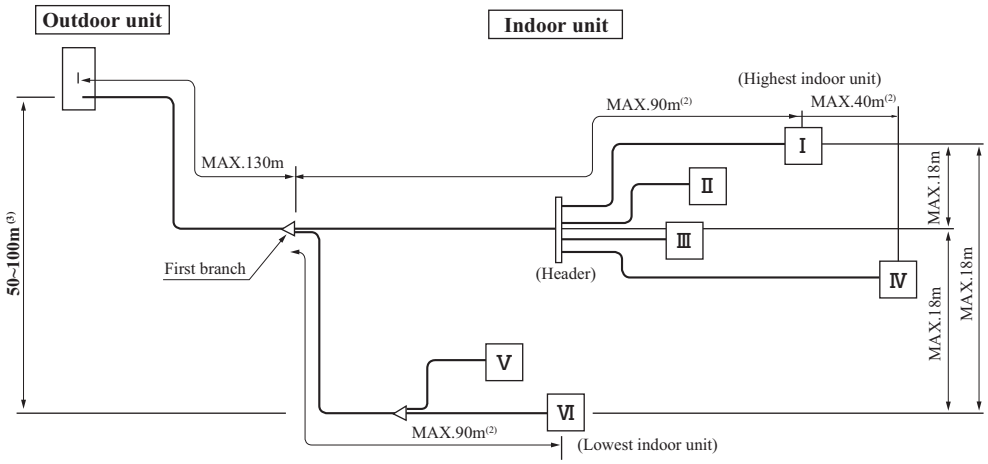
(1) Branch pipe System (Branch piping used)



(2) Header System (Header used)



(3) Mixed System (Branch piping and Header used)



Note (1) A branch piping system cannot be connected after a header system.
(2) 90m or less (However, difference between the longest and shortest piping : 40m or less)
(3) In case of less than 50m, the standard models are applied.

Important

When the Additional refrigerant quantity for piping (P) is over the following table, please separate the refrigerant line.

Outdoor unit	P (kg)
400-680	50

• Combination use

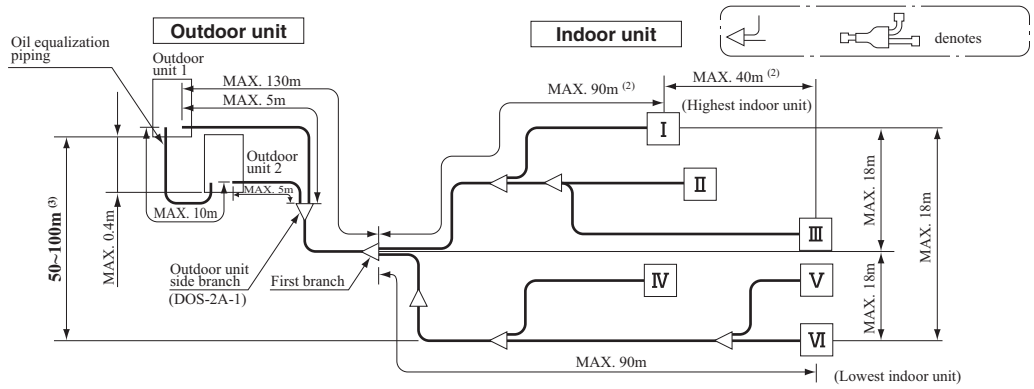
Item \ System		FDCH735CKXE6G	FDCH800CKXE6G	FDCH850CKXE6G	FDCH900CKXE6G
Indoor air temperature (Upper, lower limits)		Refer to page 15			
Outdoor air temperature (Upper, lower limits)					
Indoor units that can be used in combination	Number of connected units	2 to 53 units	2 to 58 units	2 to 61 units	2 to 65 units
	Connectable capacity (1)	368 ~ 1176	400 ~ 1280	425 ~ 1360	450 ~ 1440
Total piping length (2)		1000m or less			
Single direction piping length		Actual length : 160m or less, Equival length : 185m or less			
Main pipe length		130m or less			
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less)			
Elevation difference between the first branching point and the indoor unit		18m or less			
Difference in height between indoor and outdoor units	Outdoor unit is higher	50~100m(3)			
	Outdoor unit is lower	Prohibited activity			
Difference in the elevation of indoor units in a system		18m or less			
Difference in height between outdoor units (Same system)		MAX. 0.4m			
Difference between an outdoor unit and on outdoor unit side branch pipe		MAX. 5m			
Length of oil equalization piping		MAX. 10m			
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDQS, FDUH		Dew point temperature 28 ℃ or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23℃ or less, relative humidity 80% or less)			
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop to start)			
	Stop time	3 min or more			
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage			
	Voltage drop during start	Within ±15% of rated voltage			
	Phase unbalance	Within ±3% of rated voltage			

Item \ System		FDCH960 CKXE6G	FDCH1010 CKXE6G	FDCH1065 CKXE6G	FDCH1130 CKXE6G	FDCH1180 CKXE6G	FDCH1235 CKXE6G	FDCH1300 CKXE6G	FDCH1360 CKXE6G
Indoor air temperature (Upper, lower limits)		Refer to page15							
Outdoor air temperature (Upper, lower limits)									
Indoor units that can be used in combination	Number of connected units	2 to 69 (1) units	2 to 59 units	2 to 62 units	2 to 66 units	3 to 69 units	3 to 72 units	3 to 76 units	3 to 80 units
	Connectable capacity	477 ~ 1526	504 ~ 1311	532 ~ 1384	560 ~ 1456	588 ~ 1528	615 ~ 1599	650 ~ 1690	680 ~ 1768
Total piping length (2)		1000m or less							
Single direction piping length		Actual length : 160m or less, Equival length : 185m or less							
Main pipe length		130m or less							
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less)							
Elevation difference between the first branching point and the indoor unit		18m or less							
Difference in height between indoor and outdoor units	Outdoor unit is higher	50~100m(3)							
	Outdoor unit is lower	Prohibited activity							
Difference in the elevation of indoor units in a system		18m or less							
Difference in height between outdoor units (Same system)		MAX. 0.4m							
Difference between an outdoor unit and on outdoor unit side branch pipe		MAX. 5m							
Length of oil equalization piping		MAX. 10m							
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDQS, FDUH		Dew point temperature 28 ℃ or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23℃ or less, relative humidity 80% or less)							
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop to start)							
	Stop time	3 min or more							
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage							
	Voltage drop during start	Within ±15% of rated voltage							
	Phase unbalance	Within ±3% of rated voltage							

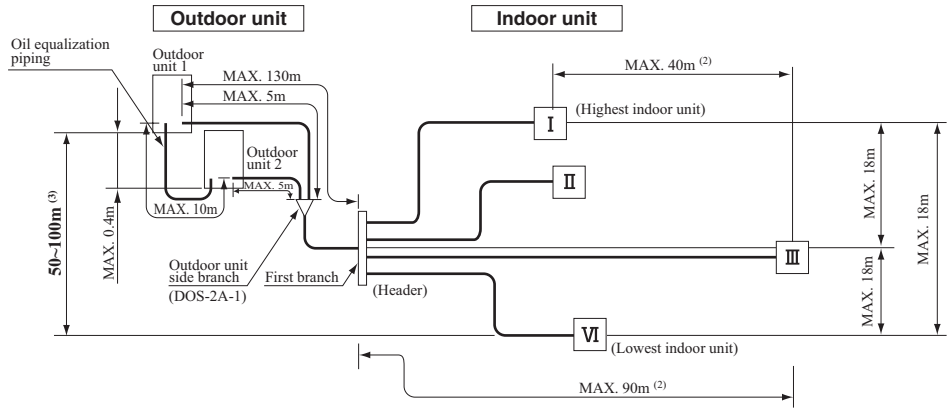
Note (1) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW (not yet) Series, limit the connectable capacity not higher than 130%.
(2) When the pipe extension length exceeds 510 m, additional refrigerant oil must be charged (1,000 cc).
(3) In case of less than 50m, the standard models are applied.

Allowable length of refrigerant piping, height difference between indoor and outdoor unit

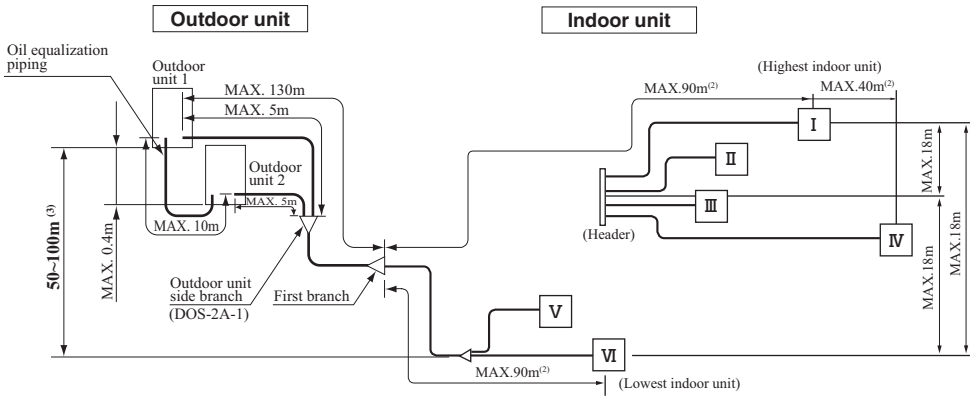
(1) Branch pipe System (Branch piping used)



(2) Header System (Header used)



(3) Mixed System (Branch piping and Header used)



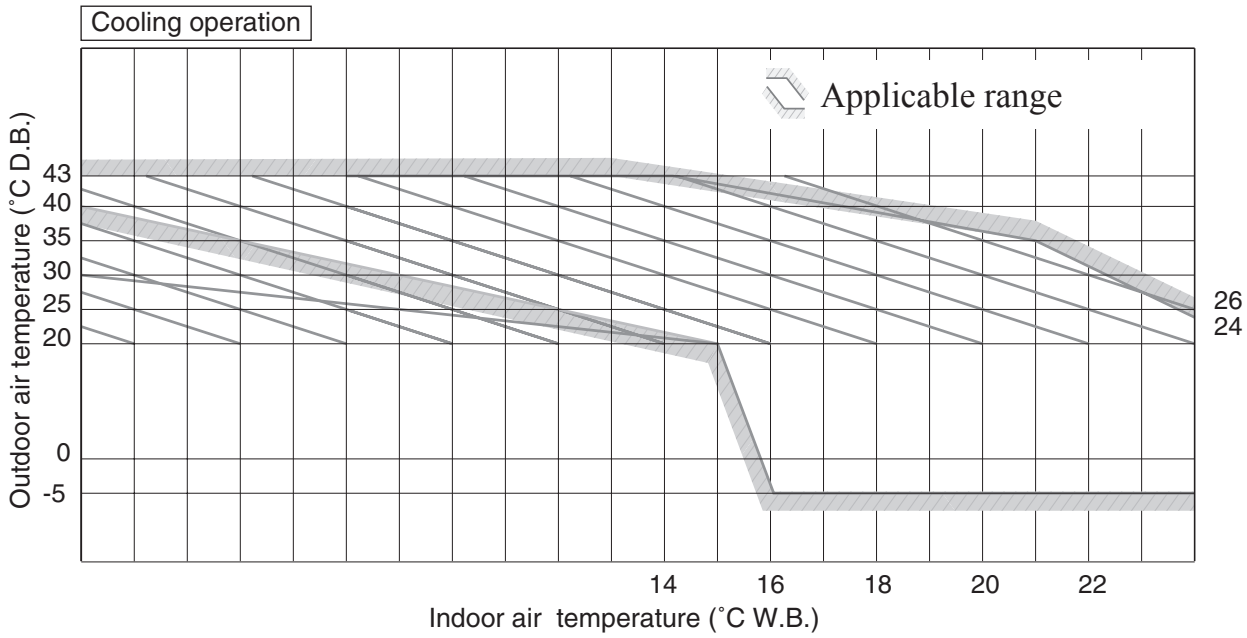
Note (1) A branch piping system cannot be connected after a header system.
(2) 90m or less (However, difference between the longest and shortest piping : 40m or less)
(3) In case of less than 50m, the standard models are applied.

Important

When the Additional refrigerant quantity for piping (P) is over the following table, please separate the refrigerant line.

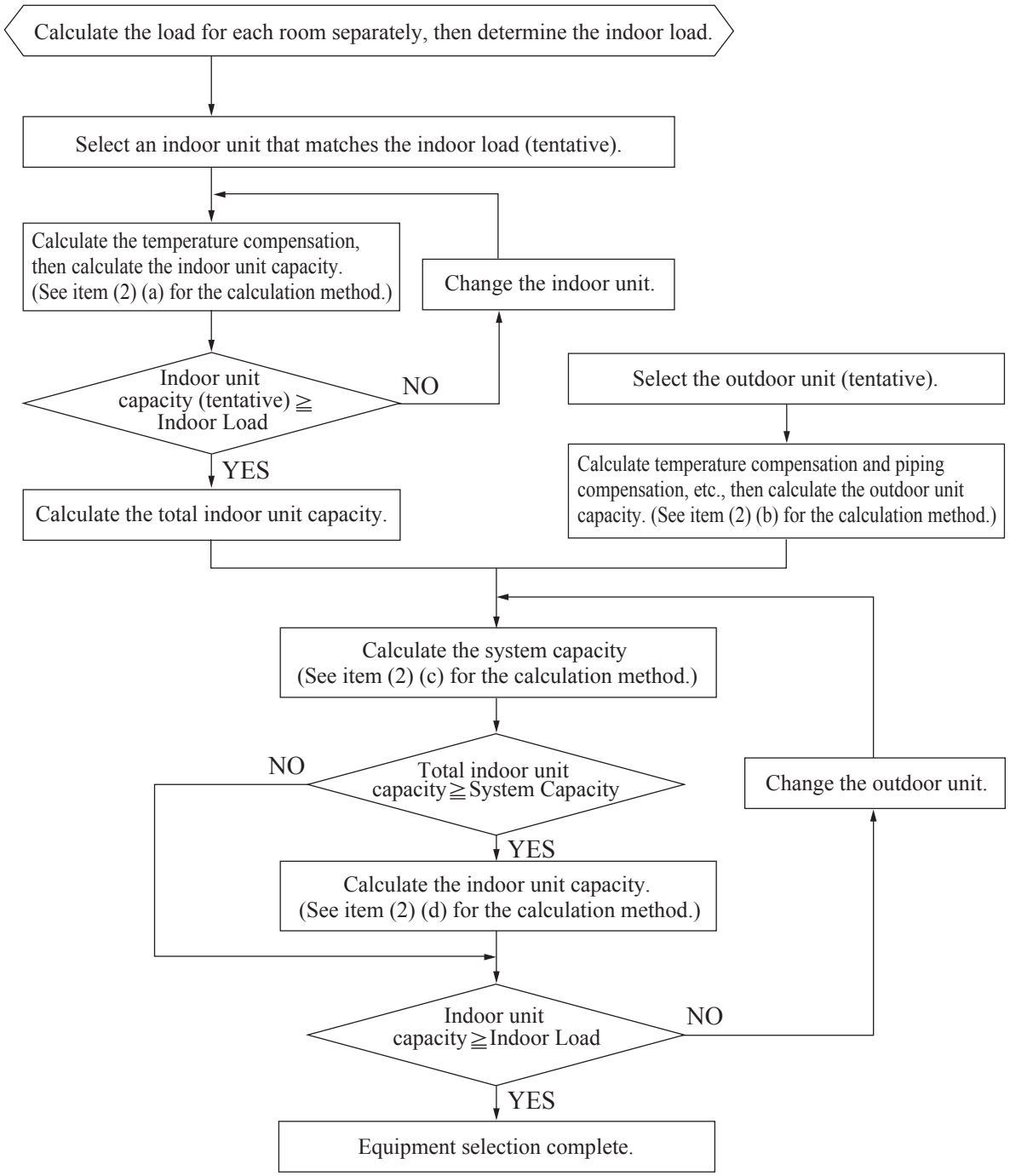
Outdoor unit	P (kg)
735-1360	100

Operating temperature range



5 SELECTION CHART

(1) Equipment selection flow


Calculate the load for each room separately, then determine the indoor load.
Select an indoor unit that matches the indoor load (tentative).
Calculate the temperature compensation, then calculate the indoor unit capacity. (See item (2) (a) for the calculation method.)
Change the indoor unit.
Indoor unit capacity (tentative) ≧ Indoor Load
NO
YES
Calculate the total indoor unit capacity.
Select the outdoor unit (tentative).
Calculate temperature compensation and piping compensation, etc., then calculate the outdoor unit capacity. (See item (2) (b) for the calculation method.)
Calculate the system capacity (See item (2) (c) for the calculation method.)
NO
Total indoor unit capacity ≧ System Capacity
YES
Change the outdoor unit.
Calculate the indoor unit capacity. (See item (2) (d) for the calculation method.)
Indoor unit capacity ≧ Indoor Load
NO
YES
Equipment selection complete.

(2) Capacity calculation method

(a) Calculating the indoor unit capacity compensation

Indoor unit capacity

= Indoor unit total rated capacity

× Capacity compensation coefficient according to temperature conditions

See item (3) (a) concerning the capacity compensation coefficient according to temperature conditions.

(b) Calculating the outdoor unit capacity compensation

Outdoor Unit Capacity

= Outdoor unit rated capacity (rated capacity when 100% connected)

× Capacity compensation coefficient according to temperature conditions

× Capacity compensation coefficient according to piping length

× Capacity compensation coefficient according to indoor unit connection capacity

① See item (3) (a) concerning the capacity compensation coefficient according to temperature conditions.

② See item (3) (b) concerning the capacity compensation coefficient according to piping length.

③ See item (3) (c) concerning the capacity compensation coefficient according to indoor unit connected capacity.

This compensation should be carried out only in cases where the indoor unit total capacity is 100% or higher.

(c) Calculating system capacity

Compare the capacities determined in items (a) and (b) above and let the smaller value be the system capacity.

① In cases where indoor unit total capacity > outdoor unit capacity

System capacity = Outdoor unit capacity

② In cases where indoor unit total capacity < outdoor unit capacity

System capacity = Indoor unit capacity

(d) Calculating indoor unit capacity [item (c) ①only]

Indoor unit capacity = System capacity × [(Indoor unit capacity) / (Indoor unit total capacity)]

Capacity calculation example

Example

Cooling (when the indoor unit connected total capacity is 100% or higher)

- Outdoor unit FDCH450CKXE6G ..... 1 Unit
- Indoor unit FDT56KXE6A ..... 10 Units
- Piping length ..... 100 m (Equivalent length)
- Indoor, outdoor unit height difference ..... 70 m (Outdoor unit is higher)
- Temperature conditions ..... Outdoor temperature: 35˚C DB
- Temperature conditions ..... Indoor temperature: 18˚C WB

<Indoor unit total cooling capacity>: Item (2) (a) calculation.

- Indoor unit rated cooling capacity: 5.6 kW
- Capacity compensation coefficient according to temperature conditions:
  0.95 (Calculated according to Indoor 18˚C WB / Outdoor 35˚C DB); (See page 19)
  Indoor unit cooling capacity: 5.6 kW × 0.95 ≒ 5.3 kW
- Indoor unit total cooling capacity calculation;
  indoor unit total cooling capacity: 5.3 kW × 10 units ≒ 53.0 kW

<Outdoor unit maximum cooling capacity> : Item (2) (b) calculation

- Outdoor unit rated cooling capacity: 45.0 kW
- Capacity compensation coefficient according to temperature conditions:
  0.95 (Calculated according to Indoor 18˚C WB / Outdoor 35˚C DB); (See page 19)
  Outdoor unit cooling capacity: 45.0 kW × 0.95 ≒ 42.8 kW
- Capacity compensation coefficient according to piping length: 0.95 (calculated according to 100 m length); (See page 20)
  42.8 kW × 0.95 ≒ 40.7 kW
- Capacity compensation coefficient according to indoor unit connected total capacity: 1.05 ← (56 × 10) / 450 ≒ 124%) (See page 23)
  40.7 kW × 1.05 ≒ 42.7 kW

<System cooling capacity>: Item (2) (c) calculation

Compare the indoor unit total cooling capacity and the outdoor unit maximum cooling capacity. The smaller value is the actual system cooling capacity.

- Indoor unit total cooling capacity : 53.0 kW ⇨ System cooling capacity: 42.7 kW
- Outdoor unit maximum cooling capacity : 42.7 kW

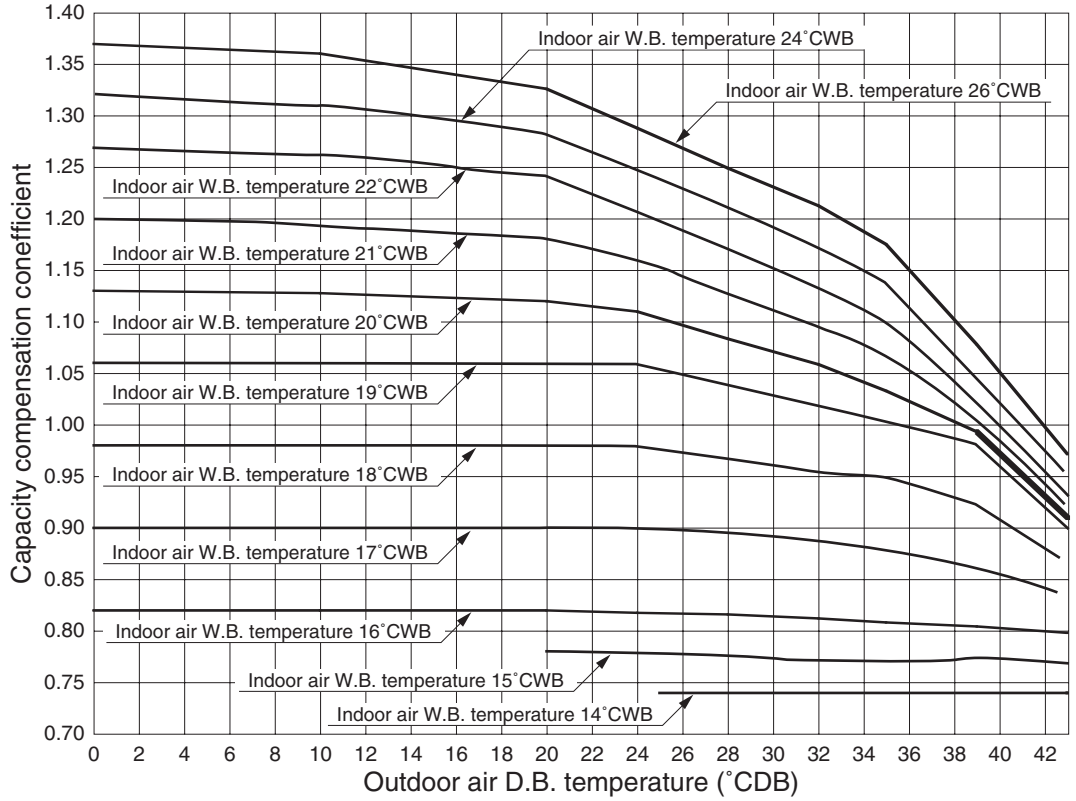
<Indoor unit cooling capacity Compensation>: Item (2) (d) calculation.

$$\frac{42.7\ \text{kW} \times 5.3\ \text{kW}}{53.0\ \text{kW}} \fallingdotseq 4.3\ \text{kW}$$

(3) Capacity compensation coefficient

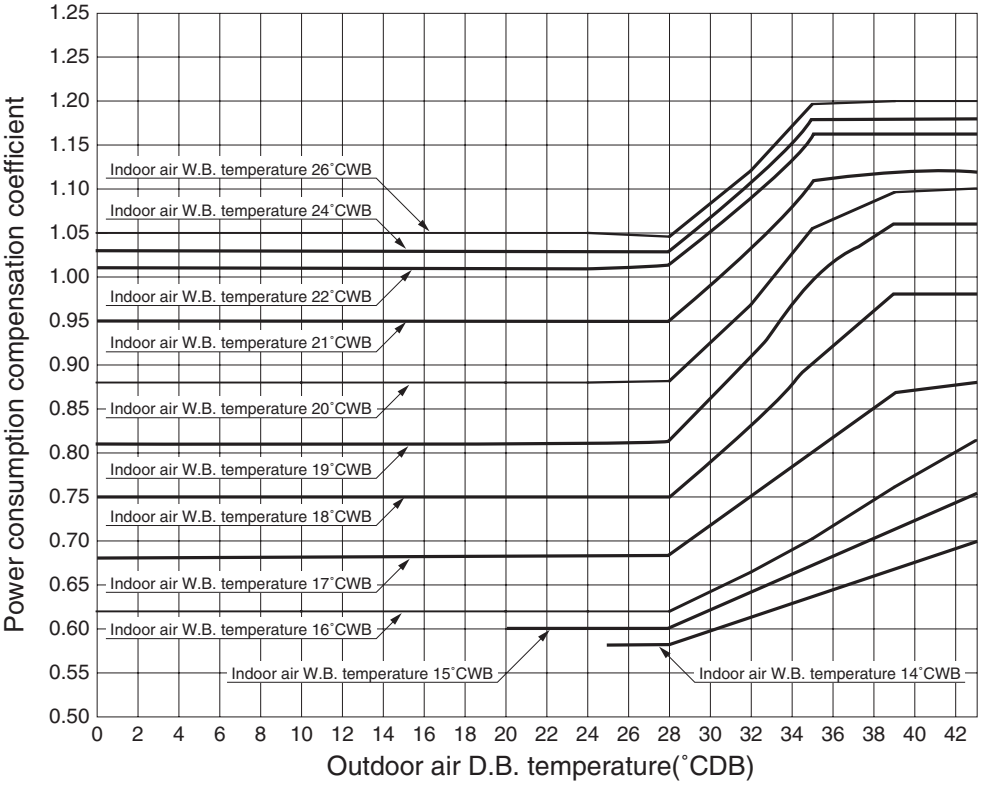
(a) Capacity compensation coefficient and power consumption compensation coefficient according to indoor and outdoor temperature conditions.

1) Capacity compensation coefficient


Capacity compensation conefficient
Outdoor air D.B. temperature (˚CDB)
Indoor air W.B. temperature 24˚CWB
Indoor air W.B. temperature 26˚CWB
Indoor air W.B. temperature 22˚CWB
Indoor air W.B. temperature 21˚CWB
Indoor air W.B. temperature 20˚CWB
Indoor air W.B. temperature 19˚CWB
Indoor air W.B. temperature 18˚CWB
Indoor air W.B. temperature 17˚CWB
Indoor air W.B. temperature 16˚CWB
Indoor air W.B. temperature 15˚CWB
Indoor air W.B. temperature 14˚CWB

Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

2) Power consumption correction factor

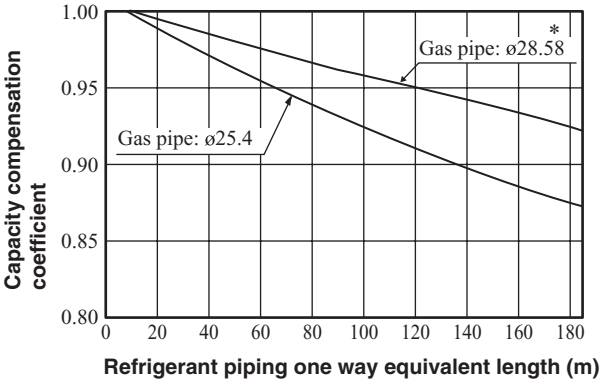

Power consumption compensation coefficient
Outdoor air D.B. temperature(˚CDB)
Indoor air W.B. temperature 26˚CWB
Indoor air W.B. temperature 24˚CWB
Indoor air W.B. temperature 22˚CWB
Indoor air W.B. temperature 21˚CWB
Indoor air W.B. temperature 20˚CWB
Indoor air W.B. temperature 19˚CWB
Indoor air W.B. temperature 18˚CWB
Indoor air W.B. temperature 17˚CWB
Indoor air W.B. temperature 16˚CWB
Indoor air W.B. temperature 15˚CWB
Indoor air W.B. temperature 14˚CWB

Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

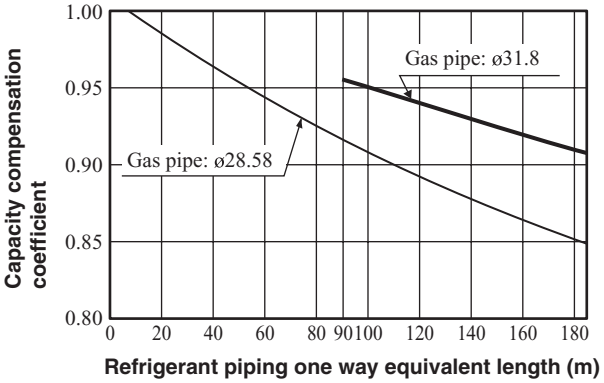
(b) Correction of capacity in relation to one way length of refrigerant piping.

(Note) This table is for reference only. If the refrigerant piping one way equivalent after the first branch is extended longer than 40 m, it could drop further by about 10% in the worst case.

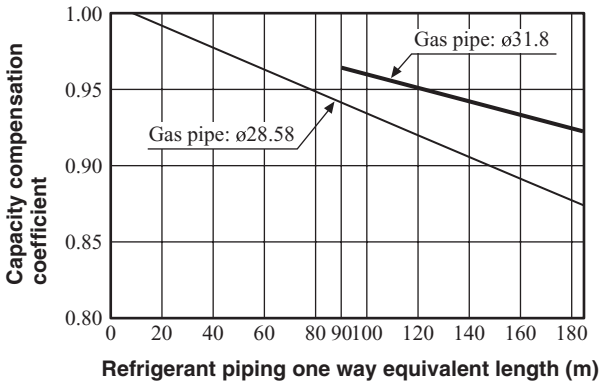
Model FDCH400CKXE6G



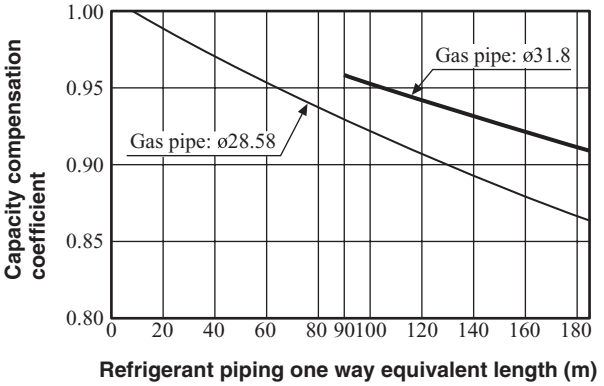
Model FDCH450CKXE6G



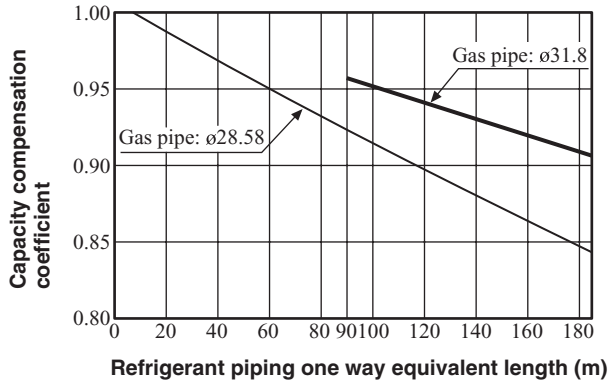
Model FDCH504CKXE6G



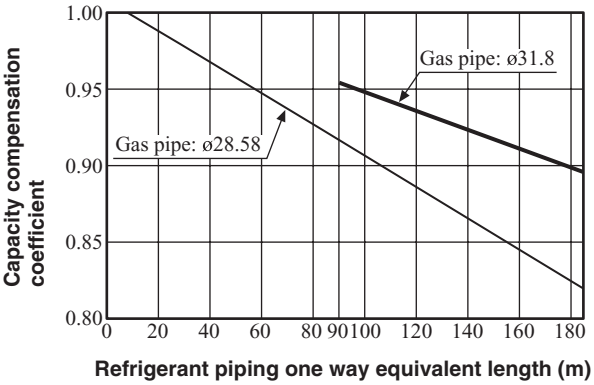
Model FDCH560CKXE6G



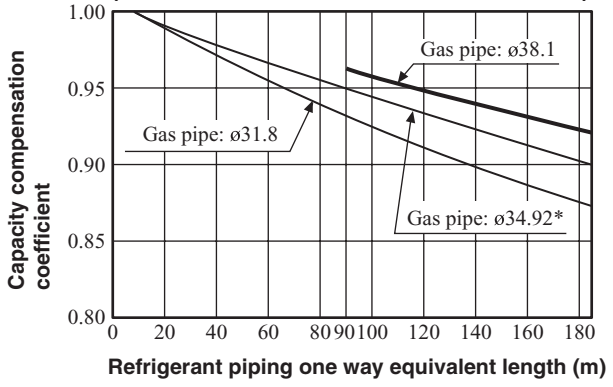
Model FDCH615CKXE6G



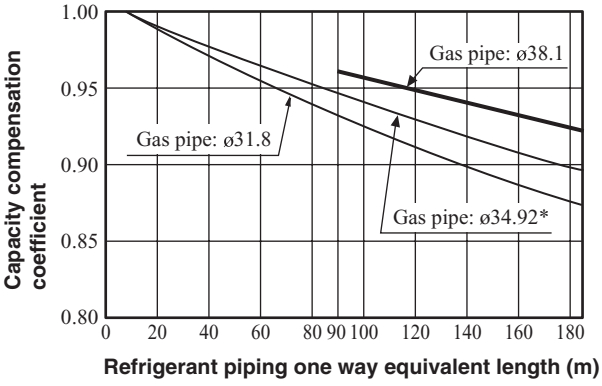
Model FDCH680CKXE6G



Model FDCH735CKXE6G
(FDCH335CKXE6G-K + FDCH400CKXE6G)

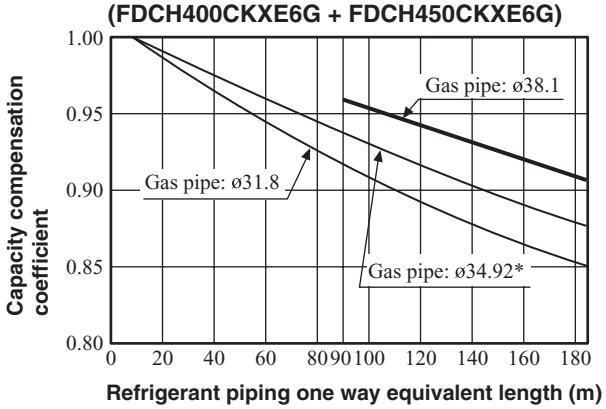


Model FDCH800CKXE6G
(FDCH400CKXE6G + FDCH400CKXE6G)

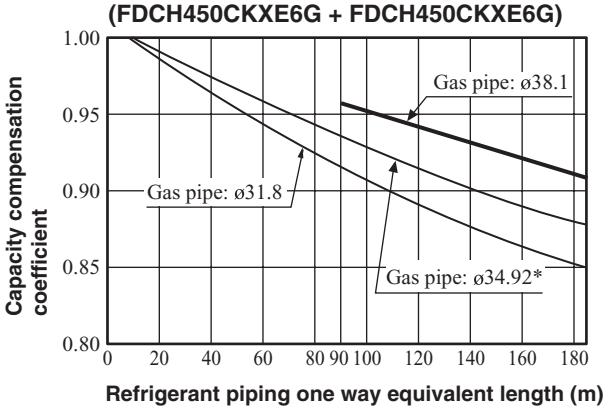


Note (1) Parts with the * mark show the piping size in case used in Europe.

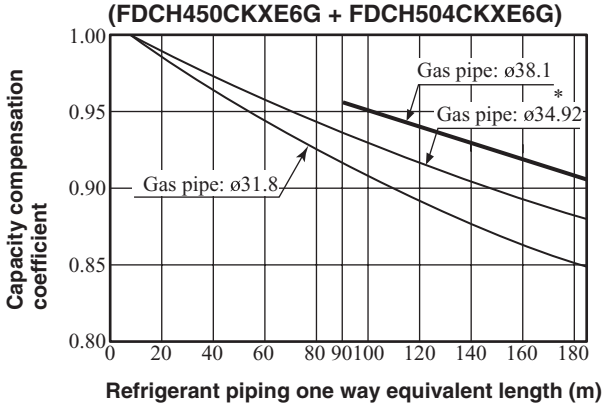
Model FDCH850CKXE6G
(FDCH400CKXE6G + FDCH450CKXE6G)



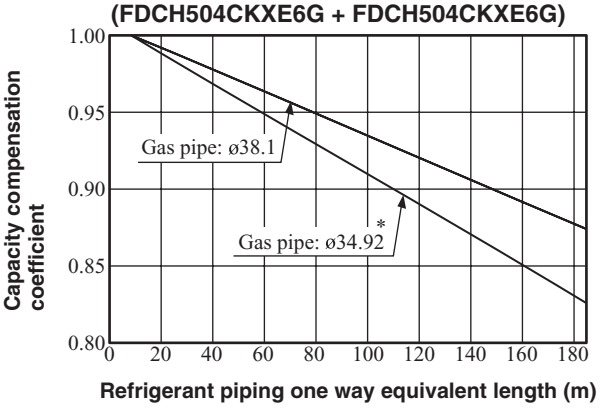
Model FDCH900CKXE6G
(FDCH450CKXE6G + FDCH450CKXE6G)



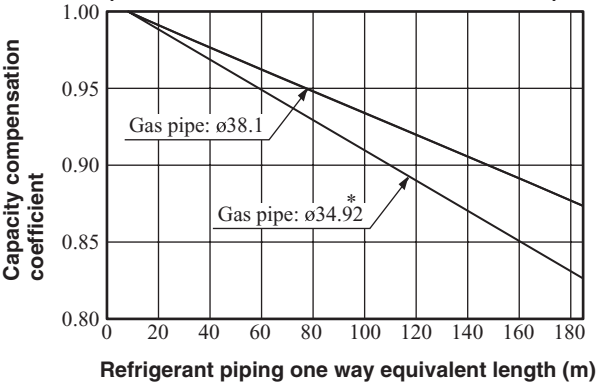
Model FDCH960CKXE6G
(FDCH450CKXE6G + FDCH504CKXE6G)



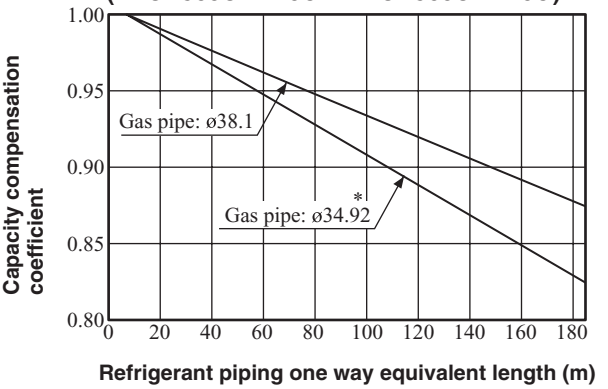
Model FDCH1010CKXE6G
(FDCH504CKXE6G + FDCH504CKXE6G)



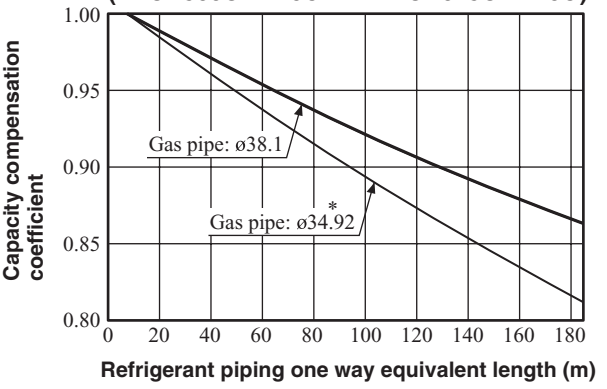
Model FDCH1065CKXE6G
(FDCH504CKXE6G + FDCH560CKXE6G)



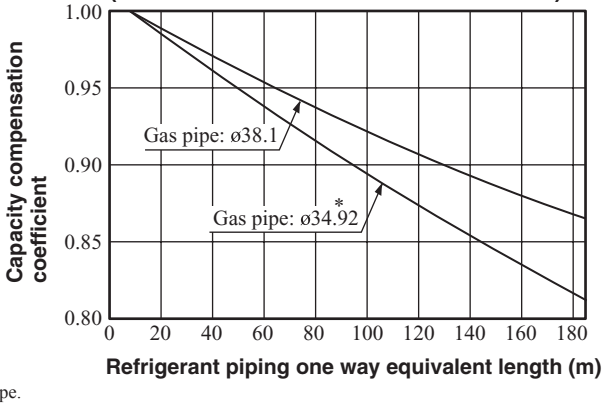
Model FDCH1130CKXE6G
(FDCH560CKXE6G + FDCH560CKXE6G)



Model FDCH1180CKXE6G
(FDCH560CKXE6G-K + FDCH615CKXE6G)

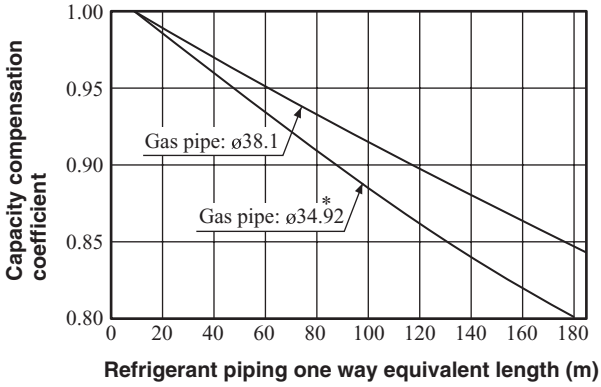


Model FDCH1235CKXE6G
(FDCH615CKXE6G + FDCH615CKXE6G)

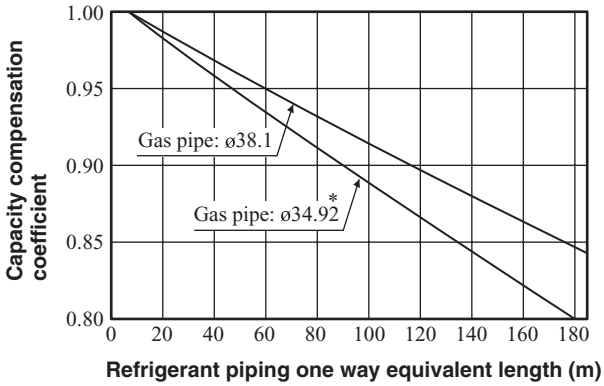


Note (1) Parts with the * mark show the piping size in case used in Europe.

Model FDCH1300CKXE6G
(FDCH615CKXE6G + FDCH680CKXE6G)



Model FDCH1360CKXE6G
(FDCH680CKXE6G + FDCH680CKXE6G)



Note (1) Parts with the * mark show the piping size in case used in Europe.

Note (2) Equivalent piping length can be obtained by calculating as follows.
Equivalent piping length = Real gas piping length + Number of bends in gas piping × Equivalent piping length of bends.

Equivalent length of each joint — Unit : m/one part

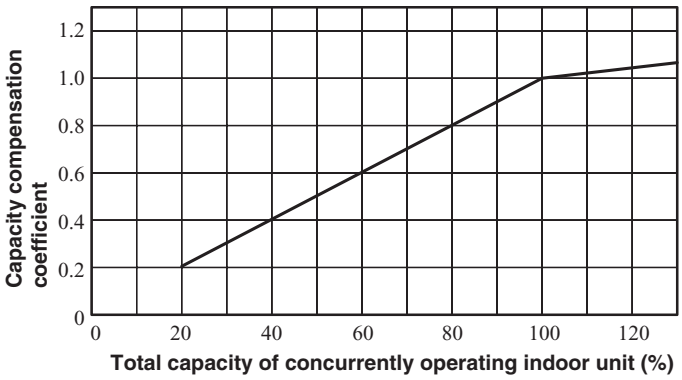
Gas piping size	ϕ15.88	ϕ19.05	ϕ22.22	ϕ25.4	ϕ28.58	ϕ31.8	ϕ34.92	ϕ38.1
Joint (90˚elbow)	0.25	0.30	0.35	0.40	0.45	0.55	0.60	0.65

(c) The capacity compensation coefficient and power consumption compensation coefficient vary according to the total capacity of concurrently operating indoor units, as shown below.

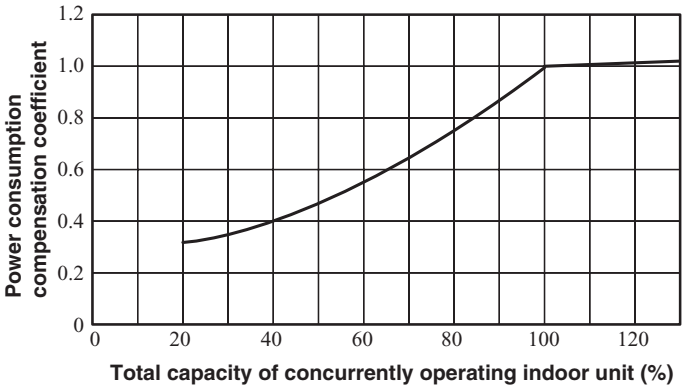
(Note) This table shows typical values.

Model FDCH400CKXE6G

◆ Capacity compensation coefficient



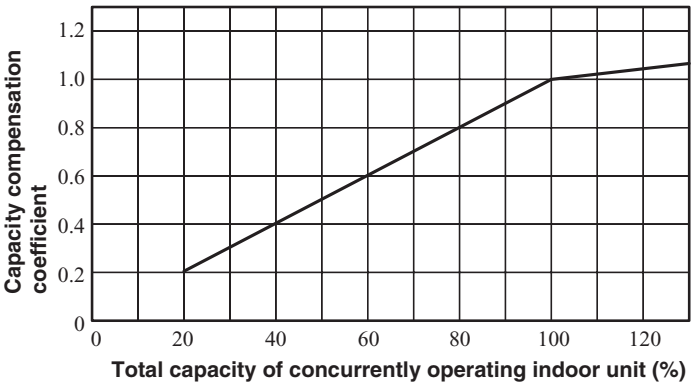
◆ Power consumption compensation coefficient



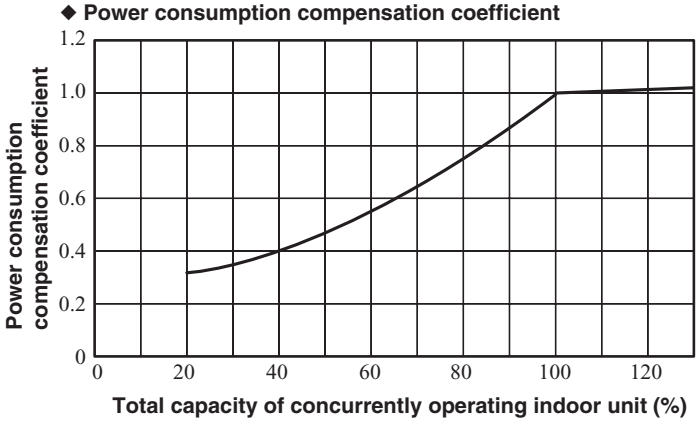
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDCH450CKXE6G

◆ **Capacity compensation coefficient**

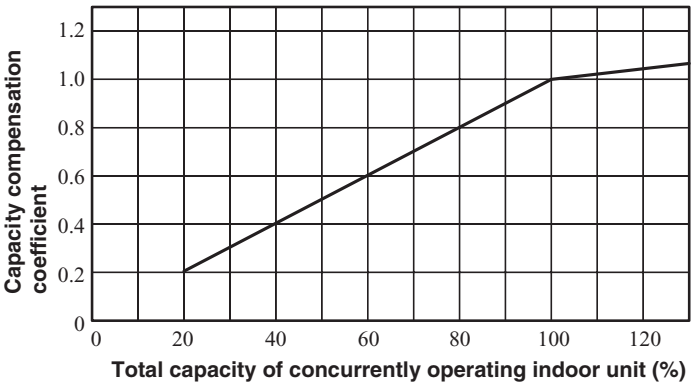


◆ **Power consumption compensation coefficient**

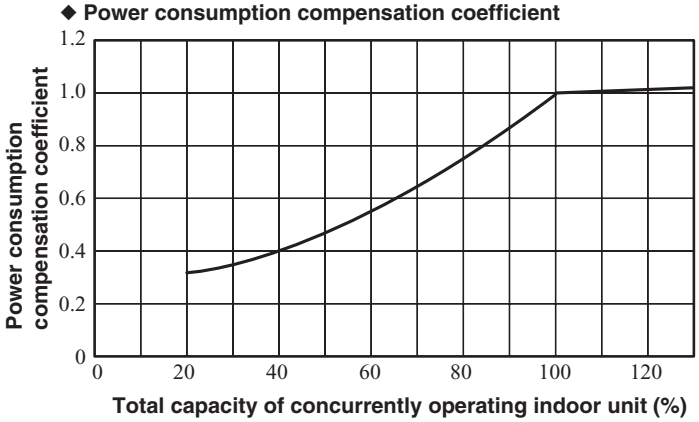


Model FDCH504CKXE6G

◆ **Capacity compensation coefficient**

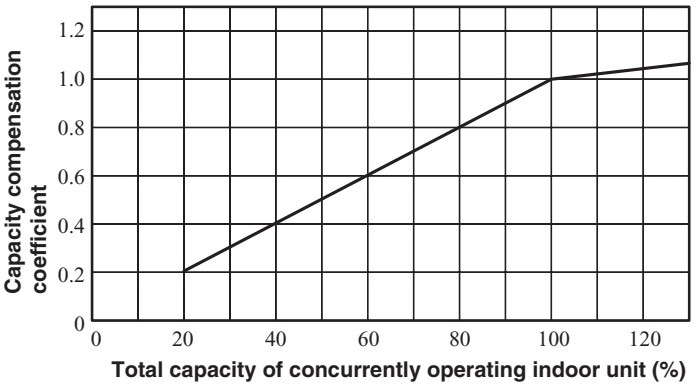


◆ **Power consumption compensation coefficient**

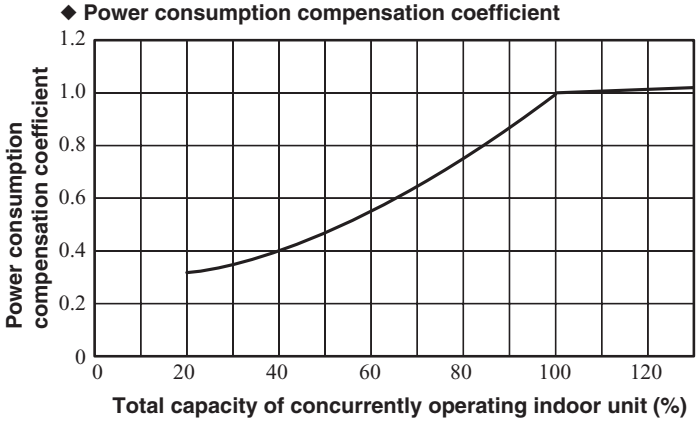


Model FDCH560CKXE6G

◆ **Capacity compensation coefficient**

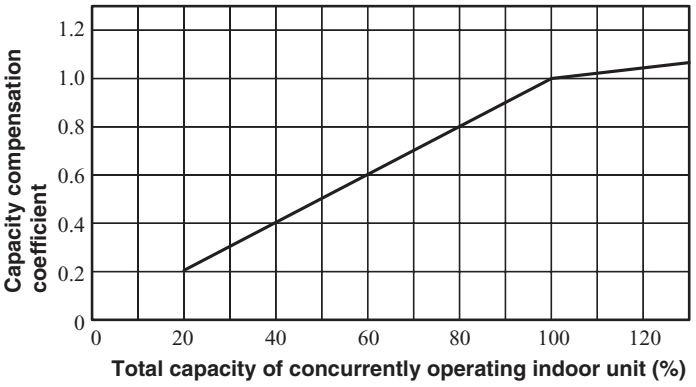


◆ **Power consumption compensation coefficient**

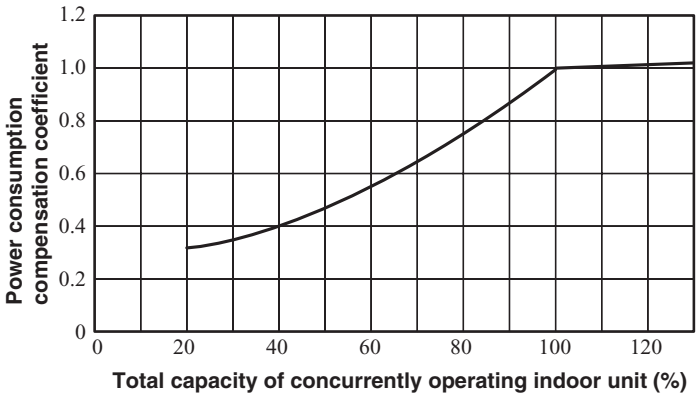


Model FDCH615CKXE6G

◆ **Capacity compensation coefficient**



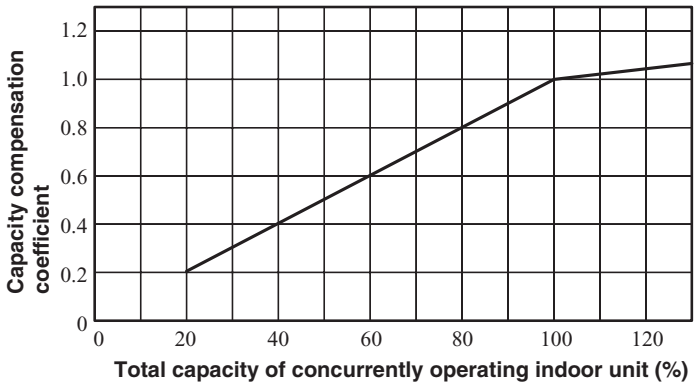
◆ **Power consumption compensation coefficient**



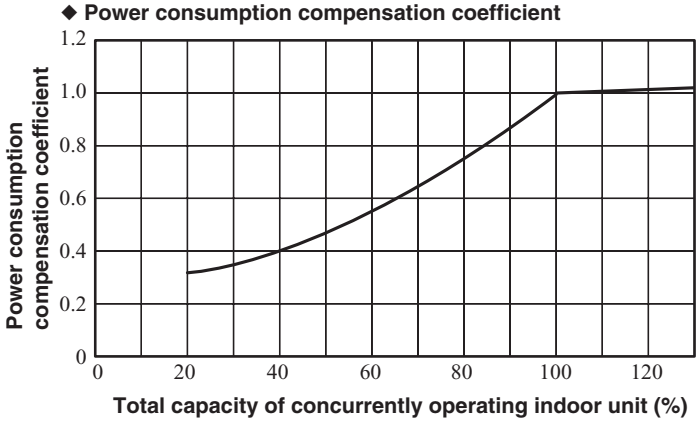
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDCH680CKXE6G

◆ Capacity compensation coefficient

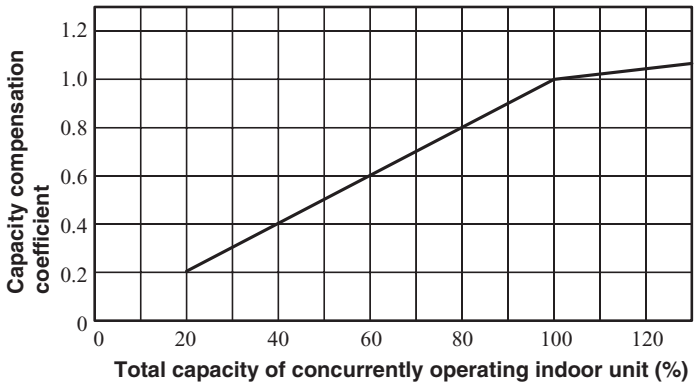


◆ Power consumption compensation coefficient

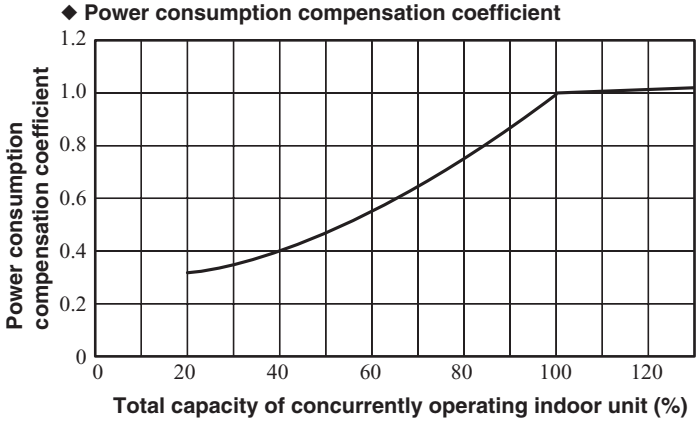


Model FDCH735CKXE6G

◆ Capacity compensation coefficient

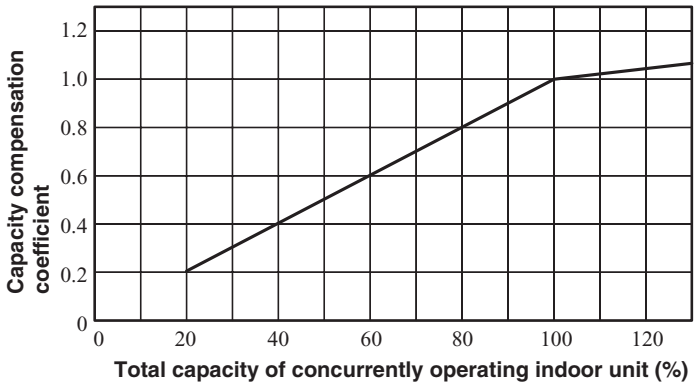


◆ Power consumption compensation coefficient

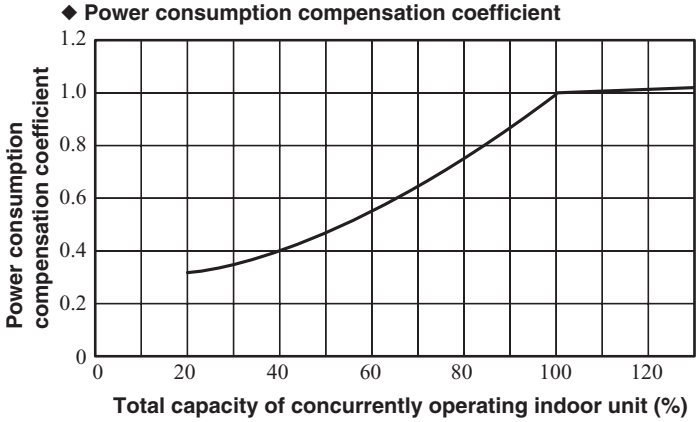


Model FDCH800CKXE6G

◆ Capacity compensation coefficient

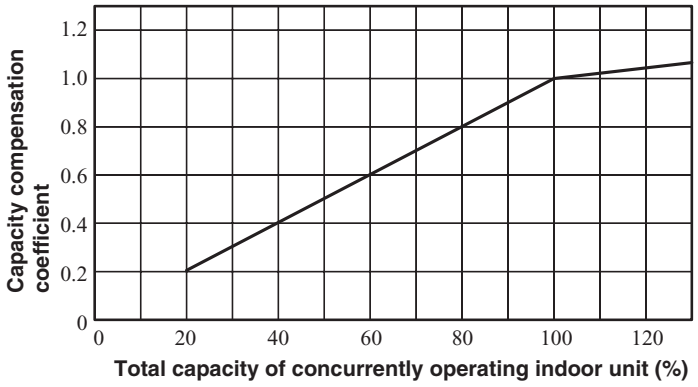


◆ Power consumption compensation coefficient

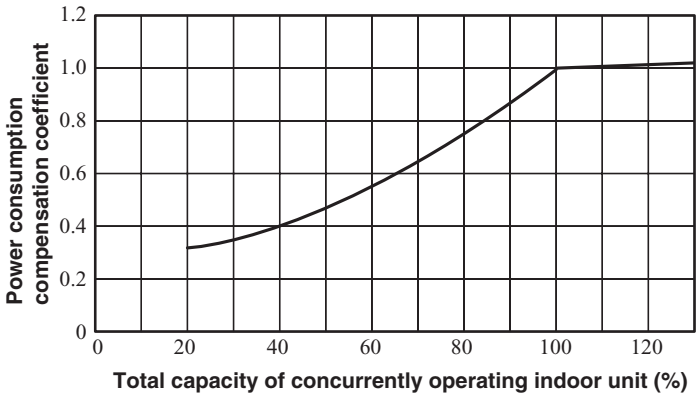


Model FDCH850CKXE6G

◆ Capacity compensation coefficient



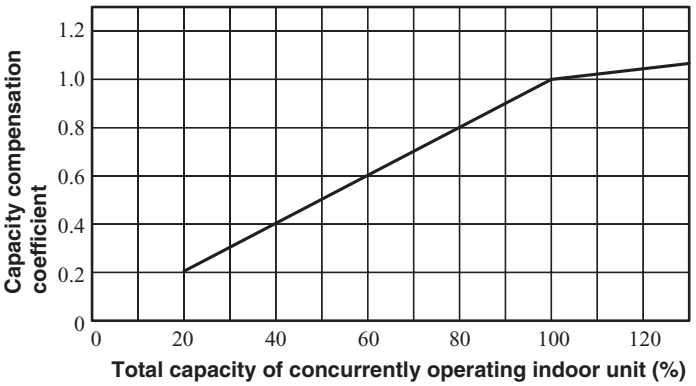
◆ Power consumption compensation coefficient



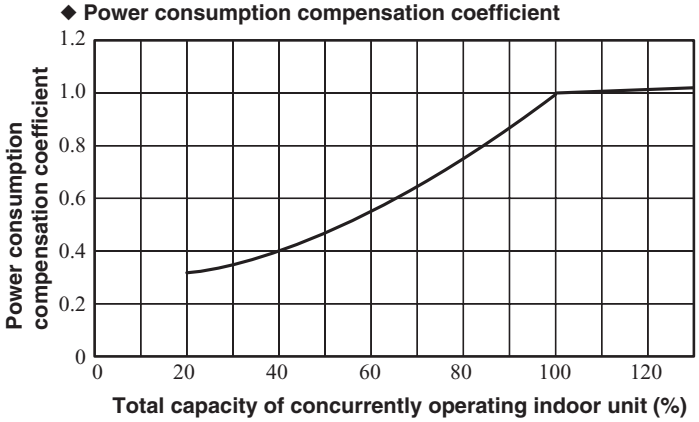
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDCH900CKXE6G

◆ Capacity compensation coefficient

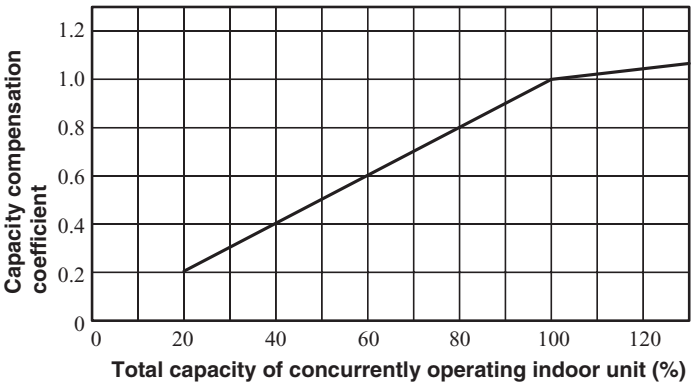


◆ Power consumption compensation coefficient

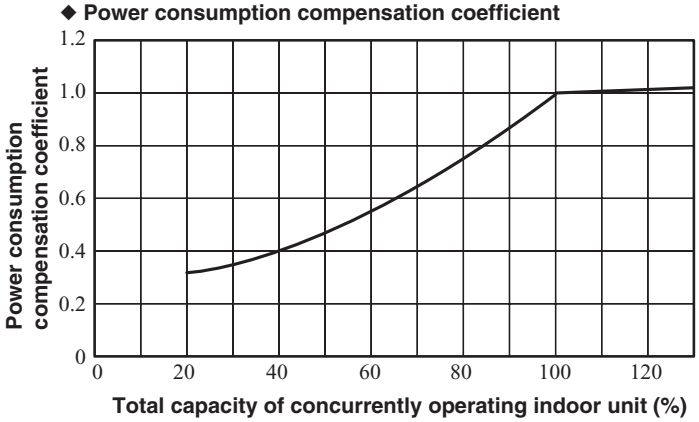


Model FDCH960CKXE6G

◆ Capacity compensation coefficient



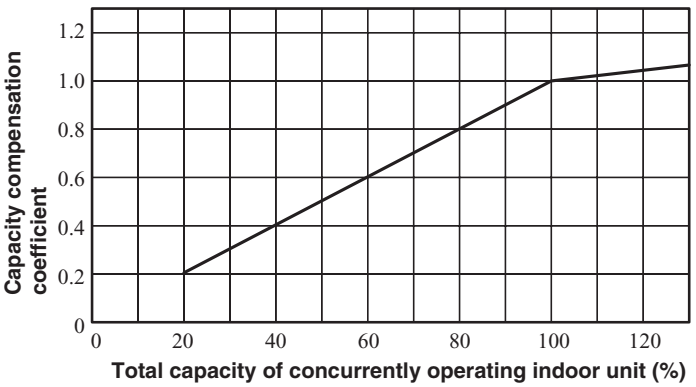
◆ Power consumption compensation coefficient



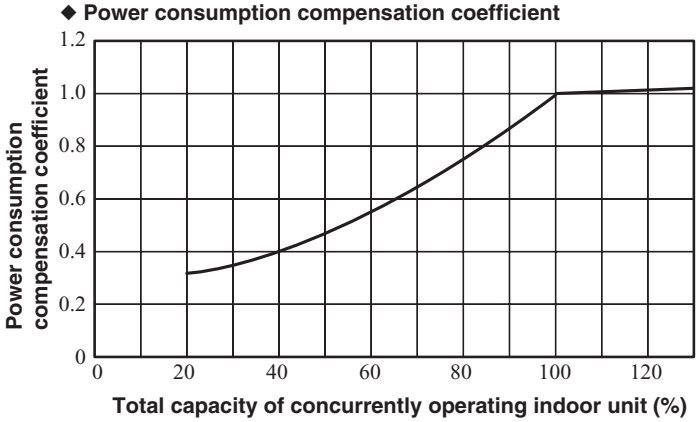
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDCH1010CKXE6G

◆ Capacity compensation coefficient

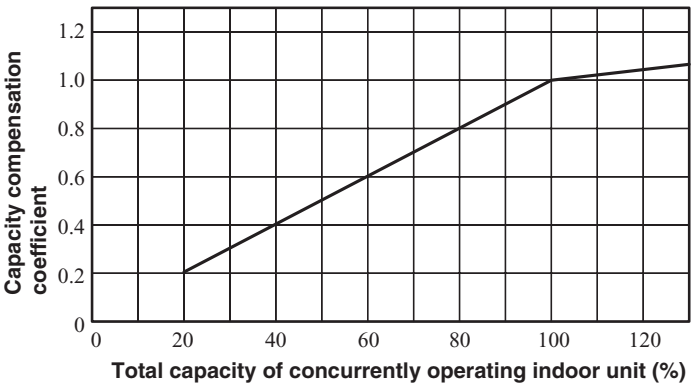


◆ Power consumption compensation coefficient

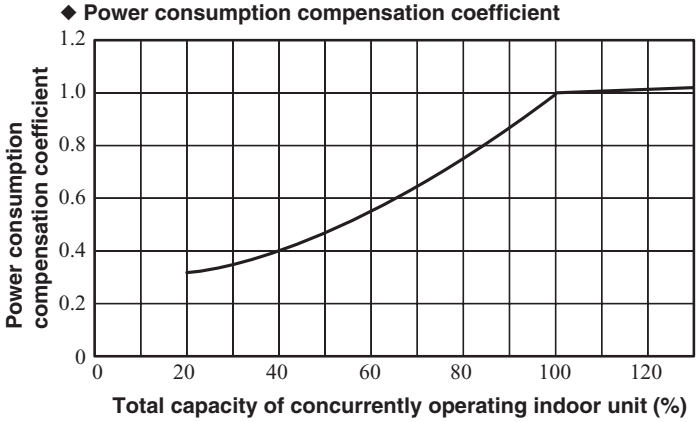


Model FDCH1065CKXE6G

◆ Capacity compensation coefficient

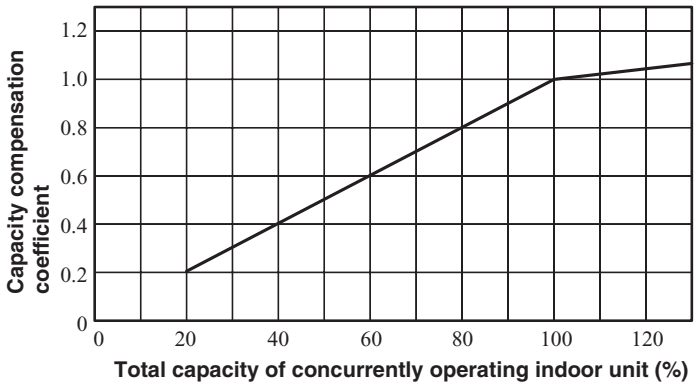


◆ Power consumption compensation coefficient

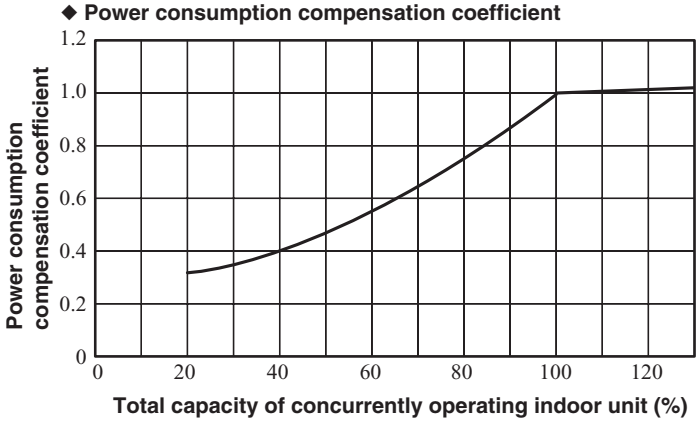


Model FDCH1130CKXE6G

◆ Capacity compensation coefficient

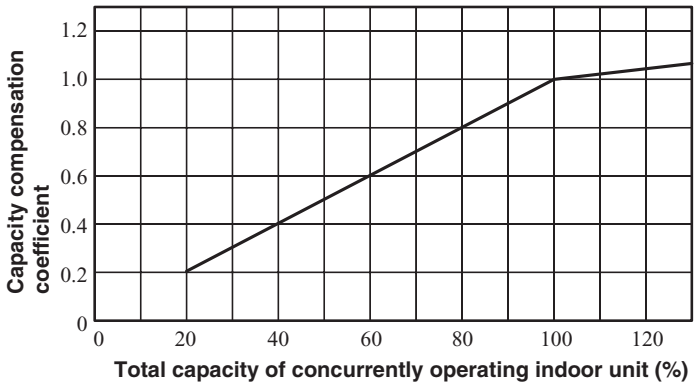


◆ Power consumption compensation coefficient

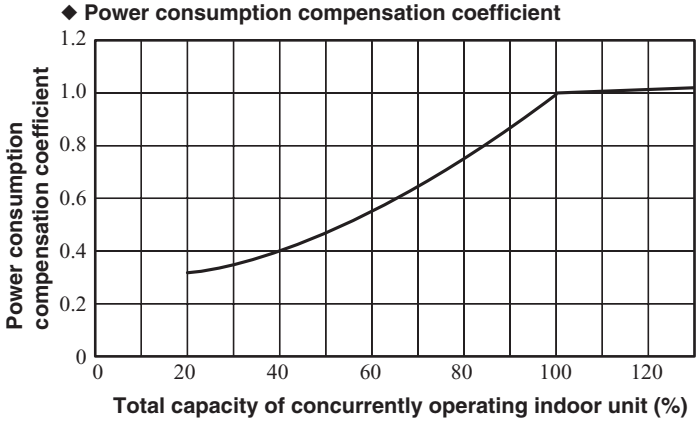


Model FDCH1180CKXE6G

◆ Capacity compensation coefficient

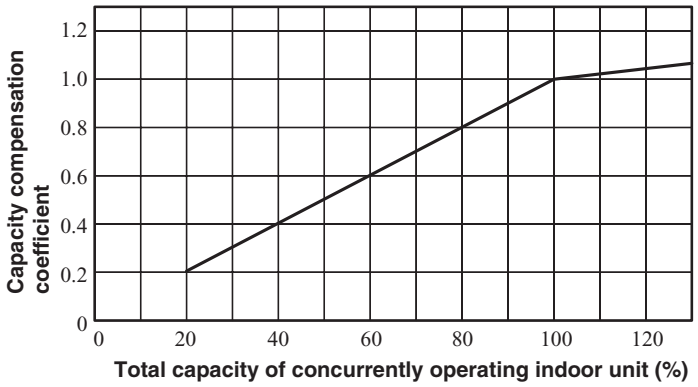


◆ Power consumption compensation coefficient

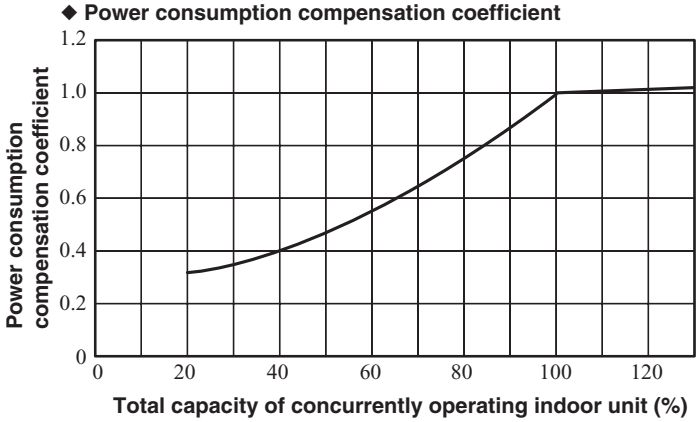


Model FDCH1235CKXE6G

◆ Capacity compensation coefficient

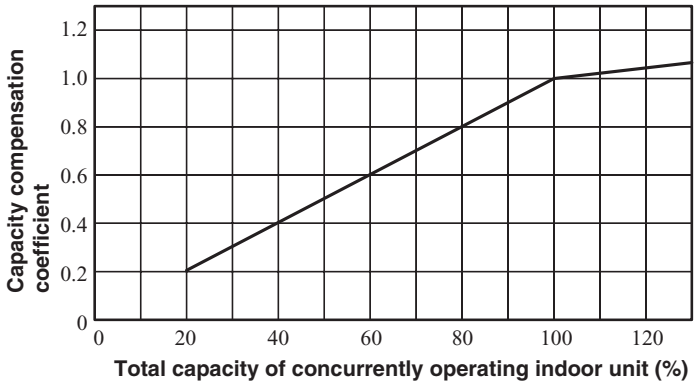


◆ Power consumption compensation coefficient

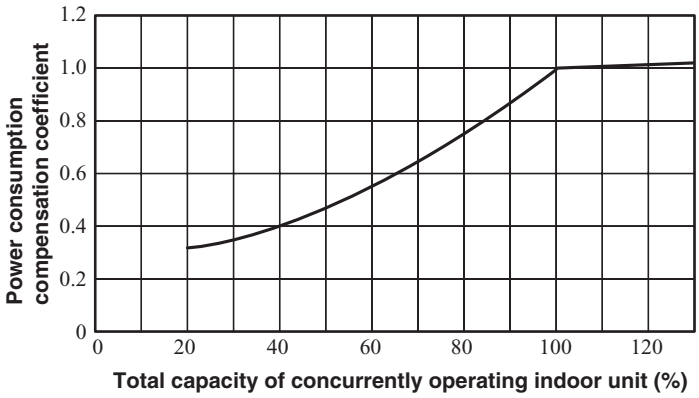


Model FDCH1300CKXE6G

◆ Capacity compensation coefficient

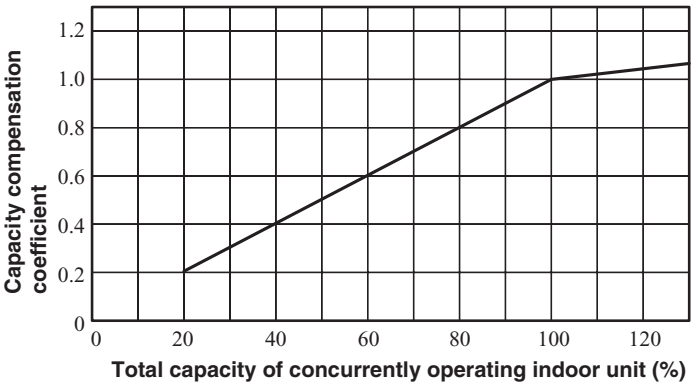


◆ Power consumption compensation coefficient

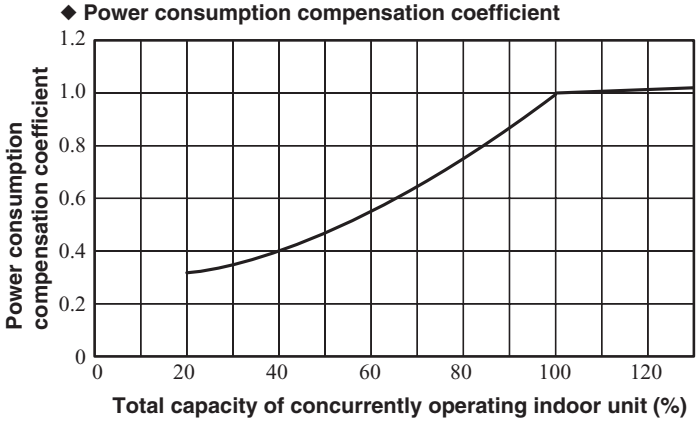


Model FDCH1360CKXE6G

◆ **Capacity compensation coefficient**



◆ **Power consumption compensation coefficient**



MITSUBISHI HEAVY INDUSTRIES, LTD. MULTI AIR CONDITIONER OUTDOOR UNIT FOR BUILDINGS

6 KX SERIES INSTALLATION MANUAL

Designed for R410A refrigerant

PSB012D942H

Outdoor unit capacity
FDCH400–1360C

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, please refer to the respective installation manuals supplied with your units.
◎Please read this manual carefully before you set to installation work and carry it out according to the instructions contained in this manual.

Precautions for safety

- Read these "Precautions for safty" carefully before starting installation work and do it in the proper way.
- Safety instructions listed here are grouped into ⚠ Warnings and ⚠Cautions. If a non-compliant installation method is likely to result in a serious consequence such as death or major injury, the instruction is grouped into ⚠ Warnings to emphasize its importance. However, a failure to observe a safety instruction listed under ⚠Cautions can also result in a serious consequence depending on the circumstances. Please observe all these instructions, because they include important points concerning safety.
- The meanings of "Marks" used here are as shown on the right: **Never do it under any circumstances.** **Always do it according to the instruction.**
- When you have completed installation work, perform a test run and make sure that the installation is working properly. Then, explain the customer how to operate and how to take care of the air-conditioner according to the user's manual. Please ask the customer to keep this installation manual together with the user's manual.
- This unit complies with EN61000-3-11.
- For outdoor unit, EN61000-3-2 and EN61000-3-12 are not applicable as consent by the utility company or notification to the utility company is given before usage.

⚠WARNING

- Installation must be carried out by the qualified installer.
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury , as a result of a system malfunction.
- Install the system in full accordance with the instruction manual.
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- Use the original accessories and the specified components for installation.
  If parts other than those prescribed by us are used, It may cause water leaks, electric shocks, fire and personal injury.
- When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage.
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- Ventilate the working area well in the event of refrigerant leakage during installation.
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- After completed installation, check that no refrigerant leaks from the system.
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit.
- Install the unit in a location with good support.
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire.
- Be sure to shut off the power before starting electrical work.
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.
  Loose connections or cable mountings can cause anomalous heat production or fire.
- Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.
  Incorrect installation may result in overheating and fire.
- Be sure not to reuse existing refrigerant pipes
  Conventional refrigerant oil or chlorine contained in the conventional refrigerant which is remaining in the existing refrigerant pipes can cause deterioration of refrigerant oil of new unit. And 1.6 times higher pressure of R410A refrigerant than conventional one can cause burst of existing pipe, personal injury or serious accident.
- Do not perform brazing work in the airtight room
  It can cause lack of oxygen.
- Use the prescribed pipes, flare nuts and tools for R410A.
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, air can be sucked into refrigerant circuit, which can cause bust or personal injury due to anomalously high pressure in the refrigerant
- Only use prescribed optional parts. The installation must be carried out by the qualified installer.
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- Do not perform any change of protective device itself or its setup condition
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- Be sure to switch off the power supply in the event of installation, inspection or servicing.
  If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- Consult the dealer or an expert regarding removal of the unit.
  Incorrect installation can cause water leaks, electric shocks or fire.
- Stop the compressor before disconnecting refrigerant pipes in case of pump down operation.
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit

- Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- Do not run the unit with removed panels or protections
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- Be sure to fix up the service panels.
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

⚠CAUTION

- Use the circuit breaker with sufficient breaking capacity.
  If the breaker does not have sufficient breaking capacity, it can cause the unit malfunction and fire.
- Take care when carrying the unit by hand.
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- Dispose of any packing materials correctly.
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.

- Carry out the electrical work for ground lead with care.
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting.

- Earth leakage breaker must be installed
  If the earth leakage breaker is not installed, it can cause electric shocks.
- Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- Do not install the unit near the location where leakage of combustible gases can occur.
  If leaked gases accumulate around the unit, it can cause fire.
- Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- Secure a space for installation, inspection and maintenance specified in the manual.
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- Do not install the outdoor unit in a location where insects and small animals can inhabit.
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- Do not install the unit in the locations listed below
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines
  - Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual)
  - Locations where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres
  - Locations where heat radiation from other heat source can affect the unit
  - Locations without good air circulation.
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where short circuit of air can occur (in case of multiple units installation)
  - Locations where strong air blows against the air outlet of outdoor unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- Do not install the outdoor unit in the locations listed below.
  - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  - Locations where outlet air of the outdoor unit blows directly to plants.
  - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  - Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect surrounding environment and cause a claim
- Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.
  It can cause the damage of the items.
- Do not touch any buttons with wet hands
  It can cause electric shocks
- Do not shut off the power supply immediately after stopping the operation.
  Wait at least 5 minutes, otherwise there is a risk of water leakage or breakdown.
- Do not control the system with main power switch.
  It can cause fire or water leakage. In addition, the fan can start unexpectedly, which can cause personal injury.
- Do not touch any refrigerant pipes with your hands when the system is in operation.
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.

Notabilia as a unit designed for R410A

- Do not use any refrigerant other than R410A. R410A will rise to pressure about 1.6 times higher than that of a conventional refrigerant.
  A cylinder containing R410A has a pink indication mark on the top.
- A unit designed for R410A has adopted a different size indoor unit operation valve charge port and a different size check joint provided in the unit to prevent the charging of a wrong refrigerant by mistake. The processed dimension of the flared part of a refrigerant pipe and a flare nut's parallel side measurement have also been altered to raise strength against pressure. Accordingly, you are required to arrange dedicated R410A tools listed in the table on the right before installing or servicing this unit.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, which results in performance degradation.
- In charging refrigerant, always take it out from a cylinder in the liquid phase.
- All indoor units must be models designed exclusively for R410A. Please check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

	Dedicated R410A tools
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charging
d)	Torque wrench
e)	Flare tool
f)	Protrusion control copper pipe gauge
g)	Vacuum pump adapter
h)	Gas leak detector

1. BEFORE BEGINNING INSTALLATION (Check that the models, power supply specifications, piping, wiring are correct.)

CAUTION

- Please read this manual without fail before you set to installation work and carry it out according to this manual.
- For the installation of an indoor unit, please refer to the installation manual of an indoor unit.
- For piping work, optional distribution parts (branching pipe set, header set) are necessary. Please refer to our catalog, etc.
- Never fail to install an earth leakage breaker. (Please use one tolerable to harmonic components)
- Operating the unit with the outlet pipe thermistor, the inlet pipe thermistor, the pressure sensor, etc. removed can result in a compressor burnout. Avoid operation under such conditions in any circumstances.

ACCESSORY

Name	Quantity	Usage location	
Wiring	2	In operating the unit in the silent mode, insert it to the outdoor unit board's CNG.	It is supplied with the unit. You can find it taped inside the control box.
Instruction manual	1	When the installation work is completed, give instructions to the customer and ask him/her to keep it.	Attached on the side panel below the operation valve.

COMBINATION PATTERNS

- The possible outdoor unit combinations and the number and the total capacity of indoor units that can be connected in a system are shown in the table below.
- Please always use indoor units designed exclusively for R410A. For connectable indoor unit model names, please check with our catalog, etc.
- It can be used in combination with the following indoor unit.

Indoor unit	Remote controller	Connection OK/NO
FD○△△KXE6	RC-E3(2 cores)	OK
FD○A△△KXE4R, KXE4BR, KXE5R	RC-E1R(3 cores)	OK
FD○A△△KXE4, KXE4(A), KXE4A	RC-E1(3 cores)	NO

Notabilia

The same outdoor unit is used whether it is used alone or in combination with another unit.

- Model type differs on the unit with 560 capacity depending on whether the unit is used independently and with the combined capacity of 1065 or 1130, or with the combined capacity of 1180.
  (When the unit is used independently and with the combined capacity of 1065 or 1130, the model type is 560. When the unit is used with the combined capacity of 1180, the model type is 560-K.)
- Please note that an installation involving a combination other than those listed below is not operable.(For example, you cannot operate 560 and 680 in combination)

Outdoor unit		Indoor unit	
Capacity	Combination patterns	Number of connectable units (units)	Range of the total capacity of indoor units connected in a system※
400	Single	1～36	200～800
450	Single	1～40	225～900
504	Single	1～36	252～806
560	Single	1～40	280～896
615	Single	2～44	308～984
680	Single	2～49	340～1088
735	Combination (400+335-K)	2～53	368～1176
800	Combination (400+400)	2～58	400～1280
850	Combination (400+450)	2～61	425～1360
900	Combination (450+450)	2～65	450～1440
960	Combination (450+504)	2～69	477～1526
1010	Combination (504+504)	2～59	504～1311
1065	Combination (504+560)	2～62	532～1384
1130	Combination (560+560)	2～66	560～1456
1180	Combination (615+560-K)	3～69	588～1528
1235	Combination (615+615)	3～72	615～1599
1300	Combination (615+680)	3～76	650～1690
1360	Combination (680+680)	3～80	680～1768

【Optional parts】

Refrigerant distribution piping components supplied as optional parts will become necessary in installing the unit.
As refrigerant distribution piping components, branching pipe sets (model type: DOS) for the outdoor unit side piping, branching pipe sets (model type: DIS) and header sets (model type: HEAD) for the outdoor unit side piping are available.
Select according to the application. Please refer to "4. Refrigerant piping work" in selecting.
If you are uncertain, please do not hesitate to consult with your distributor or the manufacturer.
Please use refrigerant branching sets and header sets designed exclusively for R410A without fail.

※ When connecting the indoor unit type FDK, FDFL or FDFU series, limit the connectable capacity not higher than130%.

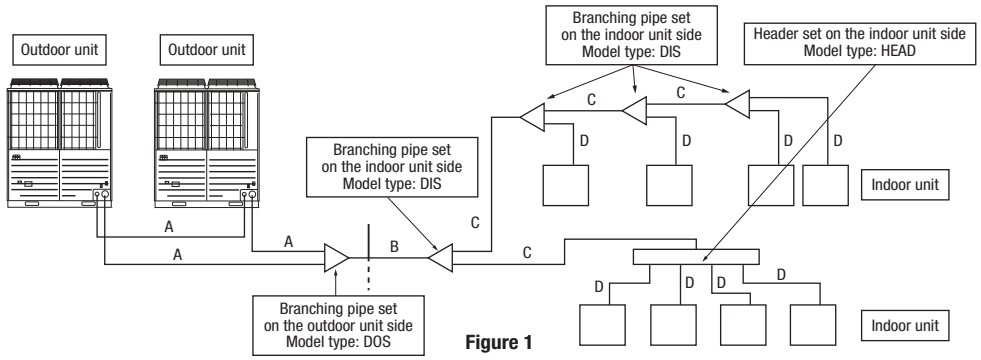


Figure 1

2. INSTALLATION LOCATION (Obtain approval from the customer when selecting the installation area.)

2-1. Selecting the installation location

- ○ Where air is not trapped.
- ○ Where the installation fittings can be firmly installed.
- ○ Where wind does not hinder the intake and outlet pipes.
- ○ Out of the heat range of other heat sources.
- ○ Where strong winds will not blow against the outlet pipe.
- ○ A place where stringent regulation of electric noises is applicable.
- ○ Where it is safe for the drain water to be discharged.
- ○ Where noise and hot air will not bother neighboring residents.
- ○ Where snow will not accumulate.
- ○ A place where no TV set or radio receiver is placed within 5m.
  (If electrical interference is caused, seek a place less likely to cause the problem)

Please note

a) A four-sided enclosure cannot be used. Leave a space of at least 1m above the unit.
b) If there is a danger of a short-circuit, then install a wind direction variable adapter.
c) When installing multiple units, provide sufficient intake space so that a short-circuit does not occur.
d) In areas where there is snowfall, install the unit in a frame or under a snow hood to prevent snow from accumulating on it.
(Inhibition of collective drain discharge in a snowy country)
e) Do not install the equipment in areas where there is a danger for potential explosive atmosphere.
* Please ask your distributor about optional parts such as wind vane adapters, snow guard hoods, etc.

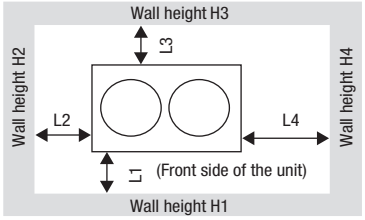
CAUTION

Please leave sufficient clearance around the unit without fail. Otherwise, a risk of compressor and/or electric component failure may arise.

2-2. Installation space (service space) example

Please secure sufficient clearance (room for maintenance work, passage, draft and piping). (If your installation site does not fulfill the installation condition requirements set out on this drawing, please consult with your distributor or the manufacturer)

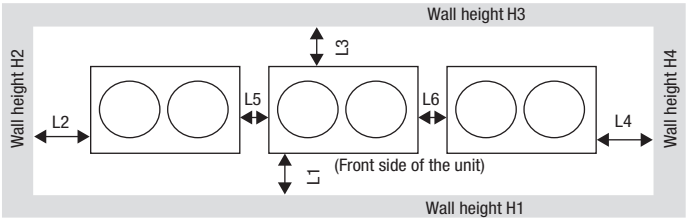
①When one unit is installed



Dimensions \ Example installation	Ⅰ	Ⅱ	Ⅲ
L1	500	500	Open
L2	10	50	10
L3	100	50	100
L4	10	50	Open
H1	1500	1500	Open
H2	No limit	No limit	No limit
H3	1000	1000	No limit
H4	No limit	No limit	Open

For a normal installation, leave a 10 mm or wider space on both sides of the unit (L5 and L6) as workspace. It is also possible to install at a 0mm interval (continuous installation) with future renewal, etc. in mind.
For your information:
the footprint of an outdoor unit is 1350x720 for all models throughout the series (335–K–680).

②When more than one unit are installed



Dimensions \ Example installation	Ⅰ	Ⅱ
L1	500	Open
L2	10	200
L3	100	300
L4	10	Open
L5	10 (0)	400
L6	10 (0)	400
H1	1500	Open
H2	No limit	No limit
H3	1000	No limit
H4	No limit	Open

3. Unit delivery and installation

⚠ CAUTION When a unit is hoisted with slings for haulage, please take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.

3-1. Delivery

- By defining a cartage path, carry in the entire package containing a unit to its installation point.
- In slinging a unit, use two canvas belts with plates, cloth pads or other protections applied to the unit to prevent damage.

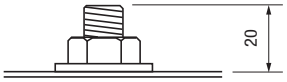
Please note

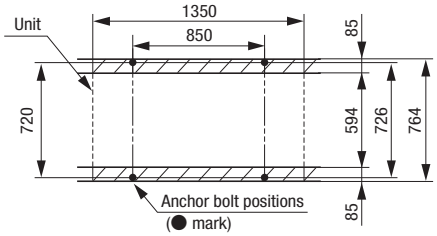
a) Please do not fail to put belts through the rectangular holes of a unit's anchoring legs.
b) Apply cloth pads between a canvas belt and a unit to prevent damage.

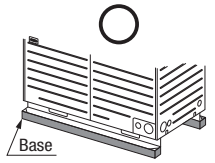
3-2. Notabilia for installation

(1) Anchor bolt positions

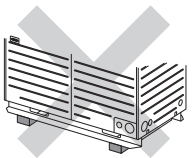
- Use four anchor bolts (M10) to fix an outdoor unit's anchoring legs at all times.
  Ideally, an anchor bolt should protrude 20mm.



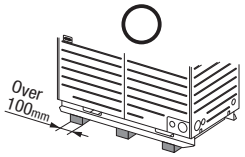




Normally, it is desirable that a base as specified in the drawing above is provided.



A base used for a former model is wrongly oriented and not acceptable.



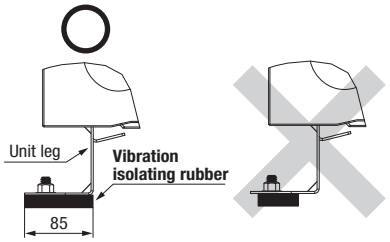
Please use it for renewal installation. (Please add a base on the center) It is necessary to prevent sagging.

(2) Base

- Please install a unit after ascertaining that the bases have been made to sufficient strength and level to ensure the unit against vibration or noise generation.
- Please construct a base to the size of a shadowed area (the entire bottom area of an outdoor unit's anchoring leg) shown on the above drawing or larger.
- Please orient a base in the traversal direction (direction of W1350mm) of an outdoor unit as illustrated in the drawing above.

(3) Vibration isolating rubber

- A vibration isolating rubber must support an outdoor unit's anchoring leg by its entire bottom area.



Please note

1) Install a vibration isolating rubber **in such a manner that the entire bottom area of an outdoor unit's anchoring leg will rest on it.**
2) Do not install an outdoor unit in such a manner that a part of the bottom area of its anchoring leg is off a vibration isolating rubber.

4. REFRIGERANT PIPING

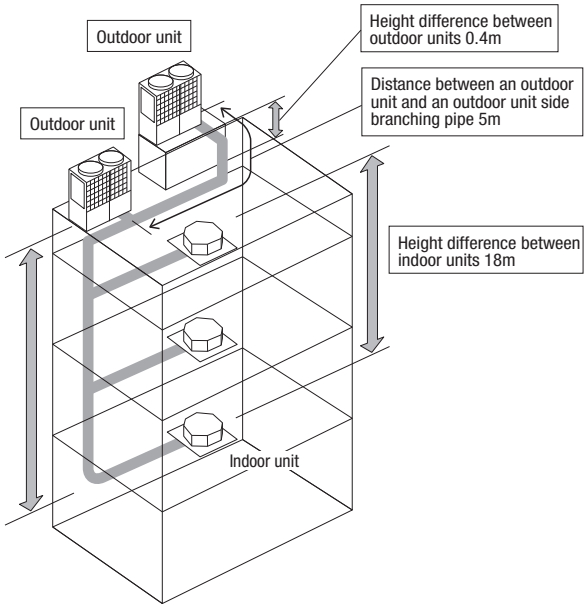
4-1. Restrictions on the use of pipes

(1) Limitation on use of pipes

- **In installing pipes, always observe the restrictions on the use of pipes specified in this Section (1) including Maximum length, Total pipe length, Allowable pipe length from the first branching, and Allowable elevation difference (head difference).**
- Please avoid forming any trap ( ) or bump ( ) in piping as they can cause fluid stagnation.
- Maximum length (from an outdoor unit to the farthest indoor unit) ····· 160 m or less as actual pipe length (185 m or less as equivalent pipe length)
  (When an actual pipe length exceeds 90m, however, it is necessary to change the gas pipe size. Please determine the main pipe size by consulting with the Main Selection Reference Table set out in Section (3) (b).
- Total pipe length ····· 1000 m or less
- Main pipe length ····· 130 m or less
- Allowable pipe length from the first branching ····· 90 m or less
  (However, difference between the longest and shortest piping ····· 40 m or less)
- Allowable elevation difference (head difference)
  (a) When an outdoor unit is installed above ····· 50~100 m
  (b) Difference in the elevation of indoor units in a system ····· 18 m or less
  (c) Elevation difference between the first branching point and the indoor unit ····· 18 m or less
- Restrictions on piping applicable to the section between an outdoor unit andan outdoor unit side branching pipe (combination unit)
  (a) Difference in the elevation ····· 0.4 m or less
  (b) Distance between an outdoor unit and an outdoor unit side branching pipe ··· 5 m or less
  (c) Length of oil equalization piping ····· 10 m or less

CAUTION

An installation not conforming to these restrictions can induce a compressor failure, which shall be excluded from the scope of warranty. Always observe the restrictions on the use of pipes in developing a system.


Outdoor unit
Height difference between outdoor units 0.4m
Outdoor unit
Distance between an outdoor unit and an outdoor unit side branching pipe 5m
Height difference between indoor units 18m
Indoor unit

Important

When the Additional refrigerant quantity (P+I) is over the following table, please separate the refrigerant line.

Outdoor unit	P+I (kg)
400-680	50
735-1360	100

Difference in the elevation	50~100m
Actual length	160m
Equivalent length	185m
Total length	1000m

(2) Piping material selection

- Please use pipes clean on both the inside and outside and free from contaminants harmful to operation such as sulfur, oxides, dust, chips, oil, fat and water.
- Use the following material for refrigerant piping.
  Material: phosphorus deoxidized seamless copper pipe (C1120T-0, 1/2H, JIS H3300)
  Use C1220T-1/2H for ϕ19.05 or larger, or C1220T-0 for ϕ15.88 or smaller
- Do not use ϕ28.58 x t1.0, ϕ31.8 x t1.1, ϕ34.92 x t1.2 and ϕ38.1 x t1.35 as a bent pipe.
- Thickness and size: Please select proper pipes according to the pipe size selection guideline.
  (Since this unit uses R410A, always use 1/2H pipes of a specified minimum thickness or thicker for all pipes of ϕ19.05 or larger, because the pressure resistance requirement is not satisfied with O-type pipes).
- For branching pipes, use a genuine branching pipe set or header set at all times. (optional parts)
- For the handling of operation valves, please refer to P.8 4-3(3) Method of operating operation valves.
- In installing pipes, observe the restrictions on the use of pipes set out in Section 1 (Maximum length, total pipe length, allowable pipe length from the first branching, allowable elevation difference (head difference)) without fail.
- Install a branching pipe set, paying attention to the direction of attachment, after you have perused through the installation manual supplied with it.

(3) Pipe size selection

(a) Outdoor unit – Outdoor unit side branching pipe: Section A in Figure 1

Please use a pipe conforming to the pipe size specified for outdoor unit connection.
Indoor unit connecting pipe size table

Outdoor unit	Outdoor unit outlet pipe specifications					
	Gas pipe	Connection method	Liquid pipe	Connection method	Oil equalizing tube	Connection method
335-K,400	ϕ25.4 (ϕ28.58) × t 1.0	Blazed	ϕ12.7× t 0.8	Flare	ϕ9.52× t 0.8 ※1	Flare
450	ϕ28.58× t 1.0					
504						
560						
615						
680						

Pipe sizes applicable to European installations are shown in parentheses.
Please use C1220T-1/2H for ϕ19.05 or larger pipes.
※1: Please connect the master and slave units with an oil equalization pipe, when they are used in a combined installation.
(It is not required, when a unit is used as a standalone installation)

(b) Main (Outdoor unit side branching pipe – Indoor unit side first branching pipe): Section B in Figure 1

If the longest distance (measured between the outdoor unit and the farthest indoor unit) is 90m or longer (actual length), please change the main gas pipe size according to the table below.

<table>
<tr><th rowspan="2">Outdoor unit</th><th colspan="2">Main pipe size (normal)</th><th colspan="2">Pipe size for an actual length of 90m or longer</th></tr>
<tr><th>Gas pipe</th><th>Liquid pipe</th><th>Gas pipe</th><th>Liquid pipe</th></tr>
<tr><td>400</td><td rowspan="2">φ25.4 (φ28.58) × t1.0</td><td rowspan="2">φ12.7× t0.8</td><td rowspan="2">φ28.58× t1.0</td><td rowspan="2">φ12.7× t0.8</td></tr>
<tr><td>450</td></tr>
<tr><td>504</td><td rowspan="5">φ28.58× t1.0</td><td rowspan="3">φ15.88× t1.0</td><td rowspan="5">φ31.8× t1.1
(φ28.58× t1.0)</td><td rowspan="3">φ15.88× t1.0</td></tr>
<tr><td>560</td></tr>
<tr><td>615</td></tr>
<tr><td>680</td><td rowspan="6">φ31.8 × t1.1
(φ34.92× t1.2)</td><td rowspan="5">φ19.05× t1.0</td><td rowspan="5">φ19.05× t1.0</td></tr>
<tr><td>735</td></tr>
<tr><td>800</td></tr>
<tr><td>850</td></tr>
<tr><td>900</td></tr>
<tr><td>960</td><td rowspan="6">φ38.1× t1.35
(φ34.92× t1.2)</td><td rowspan="6">φ38.1× t1.35
(φ34.92× t1.2)</td></tr>
<tr><td>1010</td><td rowspan="5">φ22.22× t1.0</td><td rowspan="5">φ22.22× t1.0</td></tr>
<tr><td>1065</td></tr>
<tr><td>1130</td></tr>
<tr><td>1180</td></tr>
<tr><td>1235</td></tr>
<tr><td>1300</td><td rowspan="2">φ38.1× t1.35
(φ34.92× t1.2)</td></tr>
<tr><td>1360</td></tr>
</table>

Please use C1220T-1/2H for φ19.05 or larger pipes.
Pipe sizes applicable to European installations are shown in parentheses.

(c) Indoor unit side first branching pipe – Indoor unit side branching pipe: Section C in Figure 1

Please choose from the table below an appropriate pipe size as determined by the total capacity of indoor units connected downstream, provided, **however, that the pipe size for this section should not exceed the main size (Section B in Figure 1).**

<table>
<tr><th>Total capacity of indoor units</th><th>Gas pipe</th><th>Liquid pipe</th></tr>
<tr><td>Less than 70</td><td>φ12.7× t1.0</td><td rowspan="2">φ 9.52× t0.8</td></tr>
<tr><td>70 or more but less than 180</td><td>φ15.88× t1.0</td></tr>
<tr><td>180 or more but less than 371</td><td>φ19.05× t1.0 *1</td><td>φ12.7 × t0.8</td></tr>
<tr><td>371 or more but less than 540</td><td>φ25.4× t1.0
(φ28.58)</td><td>φ15.88× t1.0</td></tr>
<tr><td>540 or more but less than 700</td><td>φ28.58× t1.0</td><td rowspan="3">φ19.05× t1.0</td></tr>
<tr><td>700 or more but less than 1100</td><td>φ31.8× t1.1 (φ34.92× t1.2)</td></tr>
<tr><td>1100 or more</td><td>φ38.1× t1.35 (φ34.92× t1.2)</td></tr>
</table>

Please use C1220T-1/2H for φ19.05 or larger pipes.
Pipe sizes applicable to European installations are shown in parentheses.
*1: When connecting indoor units of 280 at the downstream and the main gas pipe is of ø22.22 or larger, use the pipe of ø22.22x t1.0.

(d) Indoor unit side branching pipe – Indoor unit: Section D in Figure 1

Indoor unit connection pipe size table

<table>
<tr><th colspan="2">Capacity</th><th>Gas pipe</th><th>Liquid pipe</th></tr>
<tr><td rowspan="5">Indoor unit</td><td>22, 28</td><td>φ 9.52× t0.8</td><td rowspan="2">φ 6.35× t0.8</td></tr>
<tr><td>36, 45, 56</td><td>φ 12.7× t0.8</td></tr>
<tr><td>71, 80, 90, 112, 140, 160</td><td>φ15.88× t1.0</td><td rowspan="3">φ 9.52× t0.8</td></tr>
<tr><td>224</td><td>φ19.05× t1.0</td></tr>
<tr><td>280</td><td>φ22.22× t1.0</td></tr>
</table>

Please use C1220T-1/2H for φ19.05 or larger pipes.

(4) Selection of an outdoor unit side branching pipe set

This branching pipe set will always become necessary when units are used in combination.
(When a unit is used as a standalone installation, it is not required)

Outdoor unit	Branching pipe set
For two units (for 735 – 1360)	DOS-2A-1

Please note

a) In connecting an outdoor unit, please use a pipe conforming to the pipe size specified for outdoor unit connection.
b) Choose a different-diameter pipe joint matching a main pipe size specified in the following section in installing pipes (= main pipes) on the outdoor unit side.
c) Always install branching joints (for both gas and liquid) in such a manner that they form either correct horizontal or vertical branch.

(5) Selection of an indoor unit side branching pipe set

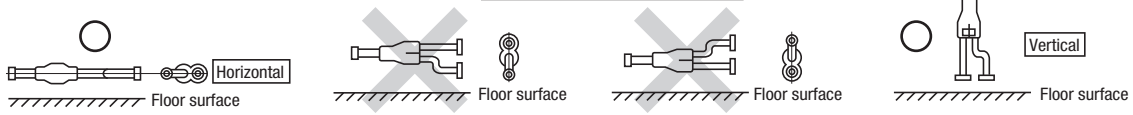
(a) Method of selecting a branching pipe set

- As an appropriate branching pipe size varies with the connected capacity (total capacity connected downstream), determine a size from the following table.

Total capacity downstream	Branching pipe set
Less than 180	DIS-22-1
180 or more but less than 371	DIS-180-1
371 or more but less than 540	DIS-371-1
540 or more	DIS-540-2

Please note

- In connecting an indoor unit with the indoor unit side branching pipe set, please use a pipe conforming to the pipe size specified for indoor unit connection.
- Always install branching pipes (both gas and liquid pipe) **either horizontally or vertically**.

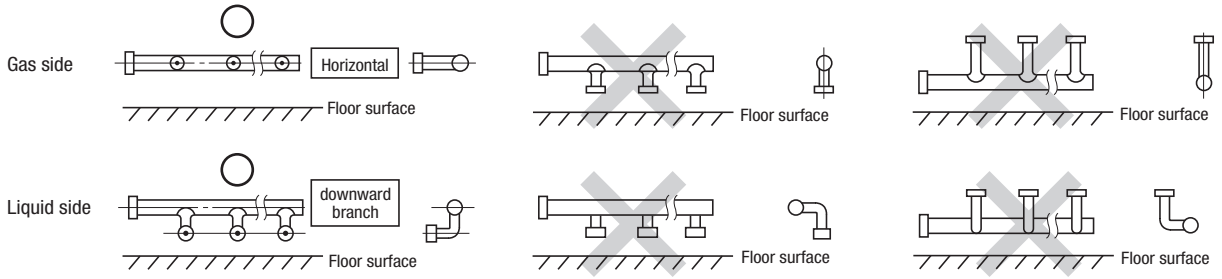


(b) Header Method

- Depending on the number of units connected, connect plugged pipes (to be procured on the installer's part) at a branching point (on the indoor unit connection side).
- For the size of a plugged pipe, please refer to the documentation for a header set (optional part).

Total capacity downstream	Header set model type	Number of branches
Less than 180	HEAD4-22-1	4 branches at the most
180 or more but less than 371	HEAD6-180-1	8 branches at the most
371 or more but less than 540	HEAD8-371-1	8 branches at the most
540 or more	HEAD8-540-2	8 branches at the most

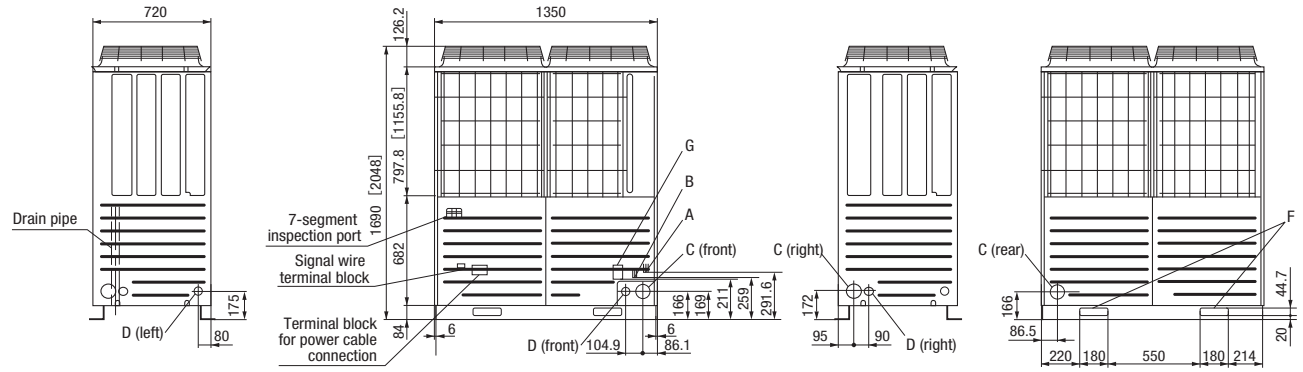
Please note a) In connecting a header with an indoor unit, please use a pipe conforming to the pipe size specified for indoor unit connection.
b) **In installing a header, always arrange a gas-side header to branch horizontally and a liquid-side header to branch downward.**
c) Indoor units 224 and 280 can not be connected to the header.



4-2. Pipe connection position and pipe direction

(1) Pipe connecting position and pipe outgoing direction

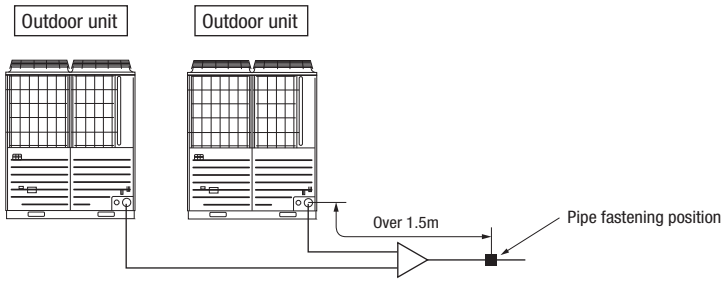
Although this drawing illustrates an installation involving a 450 or smaller capacity unit, an installation involving a 504 or a larger capacity unit should be arranged in the same manner as long as pipe connection points and directions are concerned, except that the height of a unit is different.
Measurements in [ ] indicate those of a 504 or larger capacity unit.



Explanatory marks	A: Opening for refrigerant gas pipe connection B: Opening for refrigerant liquid pipe connection C: Refrigerant pipe port (ϕ 88 or ϕ 100) D: Power cable port (ϕ 50) E: Power cable port (oblong hole measuring 40x80) F: Holes for hoisting slings G: Opening for oil equalizing pipe connection

An oil equalizing pipe must be connected only when an outdoor unit is used in a combined installation.
(When a unit is used as a standalone installation, do not connect it)

- A pipe can be laid through the front, right, bottom or rear of a unit as illustrated on the above drawings.
- In laying pipes on the installation site, cut off the casing's half blank (ϕ 88 or ϕ 100) that covers a hole for pipe penetration with nippers.
- When there is a danger that a small animal enters from the pipe port, cover the port with appropriate blocking materials (to be arranged on the user's part).
- Use an elbow (to be arranged on the user's part) to connect control valves to the piping.
- In anchoring piping on the installation site, give 1.5m or a longer distance between an outdoor unit and an anchoring point where the piping is secured as illustrated below. (A failure to observe this instruction may result in a pipe fracture depending on a method of isolating vibrations employed.)

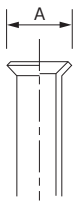


(2) Piping work

CAUTION
If you tighten it without using double spanners, you may deform the operation valve, which can cause an inflow of nitrogen gas into the outdoor unit.

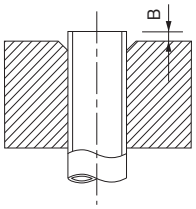
Important

- Please take care so that installed pipes may not touch components within a unit.
- **In laying pipes on the installation site, keep the operation valves shut all the time**.
- Give **sufficient protections** (compressed and brazed or by an adhesive tape) **to pipe ends so that any water or foreign matters may not enter the pipes**.
- In bending a pipe, bend it **to the largest possible radius (at least four times the pipe diameter)**. Do not bend a pipe repeatedly to correct its form.
- An outdoor unit's liquid pipe and liquid refrigerant piping are to be flare connected. Flare a pipe after engaging a flare nut onto it. A flare size for R410A is different from that for conventional R407C. Although we recommend the use of flaring tools developed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- Tighten a flare joint securely **with two spanners**. Observe flare nut tightening torque specified in the table below.



Flared pipe end: A (mm)

Copper pipe outer diameter	A $^{0}_{-0.4}$
φ6.35	9.1
φ9.52	13.2
φ12.7	16.6
φ15.88	19.7

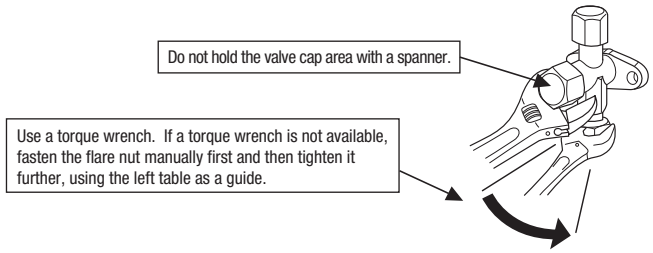


Copper pipe protrusion for flaring: B (mm)

Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
φ6.35	0～0.5	0.7～1.3
φ9.52		
φ12.7		
φ15.88		

Tightening torque (N･m)

Operation valve size (mm)	Tightening torque (N･m)	Tightening angle (°)	Recommended length of tool handle (mm)
Ø6.35 (1/4")	14～18	45～60	150
Ø9.52 (3/8")	34～42	30～45	200
Ø12.7 (1/2")	49～61	30～45	250
Ø15.88 (5/8")	68～82	15～20	300
Ø19.05 (3/4")	100～120	15～20	450

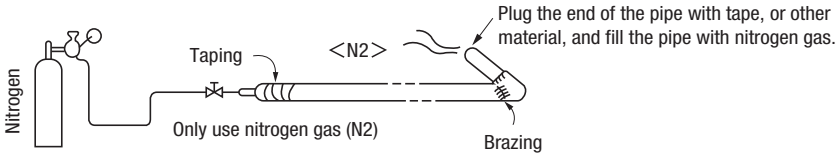

Do not hold the valve cap area with a spanner.
Use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.

- Do not apply any oil on a flare joint.
- Pipes are to be blazed to connect an outdoor unit's gas pipe with refrigerant piping or refrigerant piping with a branching pipe set.
- **Blazing must be performed under a nitrogen gas flow**. Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.
- Brazing of the operation valve and the pipes should be performed while cooling the valve body with a wet towel.
- Perform flushing. To flush the piping, charge nitrogen gas at about 0.02MPa with a pipe end closed with a hand. When pressure inside builds up to a sufficient level, remove the hand to flush. (in flushing a pipe, close the other end of the pipe with a plug).

Operation procedure

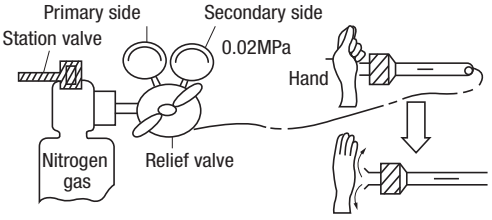
① **In laying pipes on the installation site, keep the operation valves shut all the time**.

② **Blazing must be performed under a nitrogen gas flow**. Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.


Plug the end of the pipe with tape, or other material, and fill the pipe with nitrogen gas.
Taping
<N2>
Nitrogen
Only use nitrogen gas (N2)
Brazing

③ Give **sufficient protections** (compressed and brazed or with an adhesive tape) **so that water or foreign matters may not enter the piping**.

④ Perform flushing. To flush the piping, charge nitrogen gas at about 0.02MPa with a pipe end closed with a hand. When pressure inside builds up to a sufficient level, remove the hand to flush. (in flushing a pipe, close the other end of the pipe with a plug).



⑤ In brazing an operation valve and a pipe, **braze them with the valve main body cooled with a wet towel or the like**.

PSB012D942H

4-3. Air tightness test and air purge

(1) Air tightness test

① Although an outdoor unit itself has been tested for air tightness at the factory, please check the connected pipes and indoor units for air tightness from the check joint of the operation valve on the outdoor unit side. While conducting a test, **keep the operation valve shut all the time**.

② Since refrigerant piping is pressurized to the design pressure of a unit with nitrogen gas for testing air tightness, please connect instruments according the drawing below. Under no circumstances should chlorine-based refrigerant, oxygen or any other combustible gas be used to pressurize a system

Keep the operation valve shut all the time. Do not open it under any circumstances.

Be sure to pressurize all of the liquid, gas and oil equalizing pipes.

CAUTION
Applying excessive pressure can cause an inflow of nitrogen gas into an outdoor unit.

③ In pressurizing the piping, do not apply the specified level of pressure all at once, but gradually raise pressure.

a) **Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes or more** to see if the pressure drops.

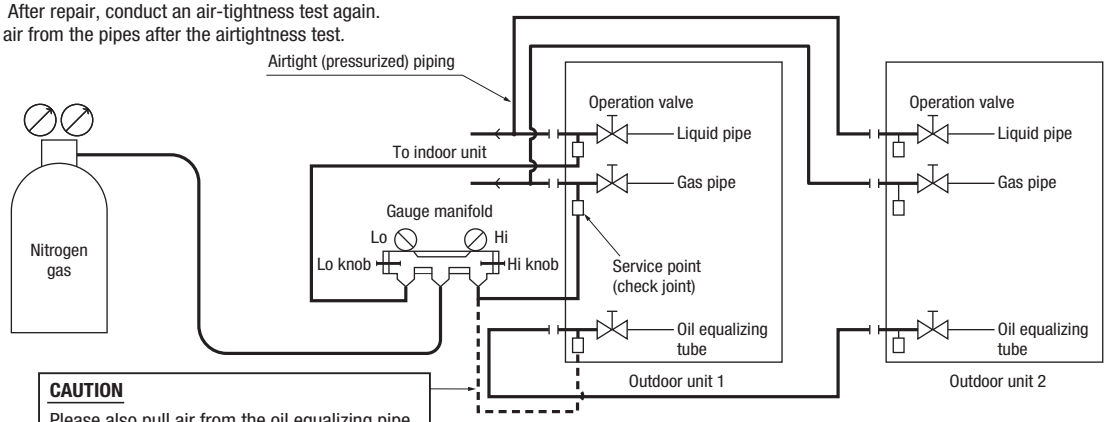
b) **Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes** to see if the pressure drops.

c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.

d) **If no pressure drop is observed with an installation pressurized to** the specified level **and left for about one day**, **it is acceptable**. When the ambient temperature changes 1℃, the pressure also changes approximately 0.01 MPa. The pressure, if changed, should be compensated for.

e) If a pressure drop is observed in checking e) and a) – d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.

④Always pull air from the pipes after the airtightness test.



CAUTION
Please also pull air from the oil equalizing pipe.

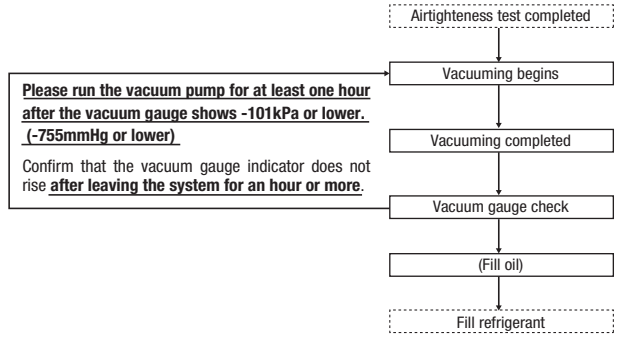
(2) Vacuuming

Please pull air **from the check joints of the operation valves on both liquid and gas sides**.

Please also **pull air from the oil equalizing pipe**. (Please pull air separately from the rest of the piping by using the oil equalizing valve check joint)

＜Work flow＞

When the system has remaining moisture inside or a leaky point, the vacuum gauge indicator will rise.
Check the system for a leaky point and then draw air to create a vacuum again.


Airtighteness test completed
Vacuuming begins
Please run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)
Confirm that the vacuum gauge indicator does not rise after leaving the system for an hour or more.
Vacuuming completed
Vacuum gauge check
(Fill oil)
Fill refrigerant

CAUTION
Insufficient vacuuming may result in poor performance falling short of the design capacity, pipe clogging due to residue moisture and/or a compressor failure.

Pay attention to the following points in addition to the above for the R410A and compatible machines.

○To prevent a different oil from entering, please assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).

○Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.

(3) Additional oil charge

When the total pipe length is longer than 510 m, charge 1,000 cc of M-MA32R refrigeration machine oil from the check joint of gas pipe operation valve after the vacuuming.

(4) Method of operating operation valves

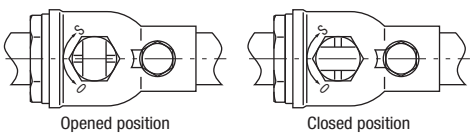
Method of opening/closing a valve

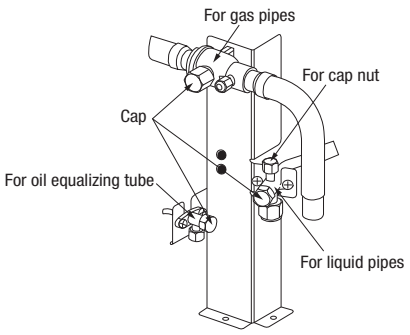
○Remove the cap, turn the gas pipe side until it comes to the “Closed” position as indicated in the drawing on the right.

○For the liquid side pipe and oil equalizing pipe side, turn with a hexagonal wrench until the shaft stops. If excessive force is applied, the valve main body can be damaged. Always use a dedicated special tool.

○Tighten the cap securely.

For tightening torque, refer to the table below.





	Tightening torque N・m		
	Shaft (valve main body)	Cap (lid)	Cap nut (check joint section)
For gas pipes	7 or less	30 or less	13
For liquid pipes	7.85 (MAX 15.7)	29.4 (MAX 39.2)	8.8 (MAX 14.7)
For oil equalizing tube	4.9 (MAX 11.8)	16.2 (MAX 24.5)	8.8 (MAX 14.7)

For fastening torque of a flare nut, please refer to Section 4-2 (2) Piping work on site.

4-4. Additional refrigerant charge

Charge additional refrigerant **in the liquid state**.

Be sure to measure the quantity **with a scale in adding refrigerant**.

If you cannot charge all refrigerant with the outdoor unit lying idle, charge it with the unit running in the test run mode. (For the test run method, please refer to Section 8)

If operated for a long time with insufficient refrigerant the compressor will be damaged. (In particular, when adding refrigerant during operation, complete the job within 30min.)

This unit contains **<400~680: 11.5 kg, 735~1360: 23.0 kg> of refrigerant**.

Determine the amount of refrigerant to be charged additionally using the following formula and put down the amount of refrigerant added on the refrigerant charge volume recording plate provided on the back the front panel.

●Adding additional refrigerant

Charge additional refrigerant according to the size and length of the liquid piping and unit capacity.

Determine additional charge volume by rounding to the nearest 0.1 kg.

Additional fill quantity (kg) = S+P+I

S: standard additional refrigerant quantity (kg)

Outdoor unit	S (kg)
400	1.3
450	3.1
504	4.8
560	5.9
615	7.1
680	8.4

Outdoor unit	S (kg)
735	1.7
800	2.6
850	4.4
900	6.2
960	7.9
1010	9.6

Outdoor unit	S (kg)
1065	10.7
1130	11.8
1180	13.0
1235	14.2
1300	15.5
1360	16.8

P: Additional refrigerant quantity for piping (kg)

P = (L1×0.37) + (L2×0.26) + (L3×0.18) + (L4×0.12) + (L5×0.059) + (L6×0.022)

L1 : φ22.22 total length (m) L2 : φ19.05 total length (m) L3 : φ15.88 total length (m)

L4 : φ12.7 total length (m) L5 : φ9.52 total length (m) L6 : φ6.35 total length (m)

Refrigerant liquid pipe size	φ22.22	φ19.05	φ15.88	φ12.7	φ9.52	φ6.35	Remarks
Additional fill quantity (kg/m)	0.37	0.26	0.18	0.12	0.059	0.022	

I: Additional refrigerant quantity for indoor units (kg)

If the total indoor units capacity is larger than 1.3 times of outdoor unit capacity, then calculate the additional refrigerant quantity for indoor units.

D = {(Total indoor units capacity) - (outdoor unit capacity) x 1.3}

I = D x 0.01

When D > 0, calculate I using the above equation;

When D ≦ 0, take it as I = 0.

<Example>

When you connect FDC400 to FDT140×4 units:

D = 140×4 - 400×1.3 = 40 (>0)

I = 40×0.01 = 0.4 (kg)

Important

When the Additional refrigerant quantity (P+I) is over the following table, please separate the refrigerant line.

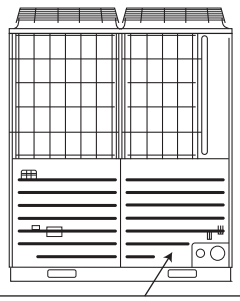
Outdoor unit	P+I (kg)
400-680	50
735-1360	100

Pay attention to the following points in addition to the above for the R410A and compatible machines.

- To prevent a different oil from entering, please assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
- Refrigerant types are indicated by color at the top of the cylinder 5. (Pink for R410A). Always confirm this.
- Do not use a charge cylinder under any circumstances. There is a danger that the composition of the refrigerant will change when R410A is transferred to a cylinder.
- When charging refrigerant, use liquid refrigerant from a cylinder. If refrigerant is charged in a gas form, the composition may change considerably.

Please note

Put down on the refrigerant charge volume recording plate provided on the back of the front panel the amount of refrigerant calculated from the pipe length.



It is located in back of this front panel.

CAUTION

Be sure to record the refrigerant volume, because the information is necessary to perform the installation's maintenance service.

4-5. Heating and condensation prevention

①Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.

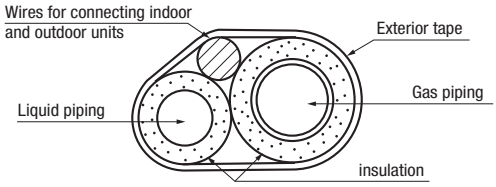
②Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.

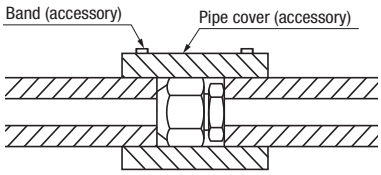
a) The gas pipe can cause during a cooling operation dew condensation, which will become drain water causing a possible water-leak accident, or reach during a heating operation as high a temperature as 60℃ to 110℃, posing a risk of burns, when touched accidentally. So, do not fail to dress it with a heat insulation material.

b) Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).

c) Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and wrap them together with a connecting cable by a dressing tape.

d) Although this air conditioning unit has been tested under the JIS condensation test conditions, the dripping of water may occur when it is operated in a high-humidity atmosphere (23℃ or a higher dew point temperature). In such a case, apply an additional heat insulation material of 10 to 20 mm thick to dress an indoor unit body, piping and drain pipes.
When the ambient dew point temperature becomes 28℃ or higher, or the relative humidity becomes 80% or higher, add further 10 to 20 mm thick heat insulation material.





5. Drainage

- Where water drained from the outdoor unit may freeze, connect the drain pipe using optional drain elbow and drain grommet.

6. ELECTRICAL WIRING WORK

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.
Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

⚠ **Please install an earth leakage breaker without fail**. The installation of an earth leakage breaker is compulsory in order to prevent electric shocks or fire accidents. (Since this unit employs inverter control, please **use an impulse withstanding type** to prevent an earth leakage breaker's false actuation.)

Please note

a) Use only copper wires.
Do not use any supply cord lighter than one specified in parentheses for each type below.
- braided cord (code designation 60245 IEC 51), if allowed in the relevant part 2;
- ordinary tough rubber sheathed cord (code designation 60245 IEC 53);
- flat twin tinsel cord (code designation 60227 IEC 41)
- ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53).

Please do not use anything lighter than polychloroprene sheathed flexible cord (cord designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.

b) **Use separate power supplies for the indoor and outdoor units**.

c) A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.

d) **The power supplies for indoor units in the same system should turn on and off simultaneously**.

e) Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire.
If improperly grounded, an electric shock or malfunction may result.
Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.

f) **The installation of an impulse withstanding type earth leakage breaker is necessary**. A failure to install an earth leakage breaker can result in an accident such as an electric shock or a fire. Do not turn on the power until the electrical work is completed. Be sure to turn off the power when servicing.

g) Please do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor, while it can cause an abnormal overheat accident)

h) For power supply cables, use conduits.

i) Please **do not lay electronic control cables (remote control and signaling wires) and other high current cables together outside the unit**. Laying them together can result in malfunctioning or a failure of the unit due to electric noises.

j) Power cables and signaling wires must always be connected to the power cable terminal block and secured by cable fastening clamps provided in the unit.

k) Fasten cables so that they may not touch the piping, etc.

l) **When cables are connected, please make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection** and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)

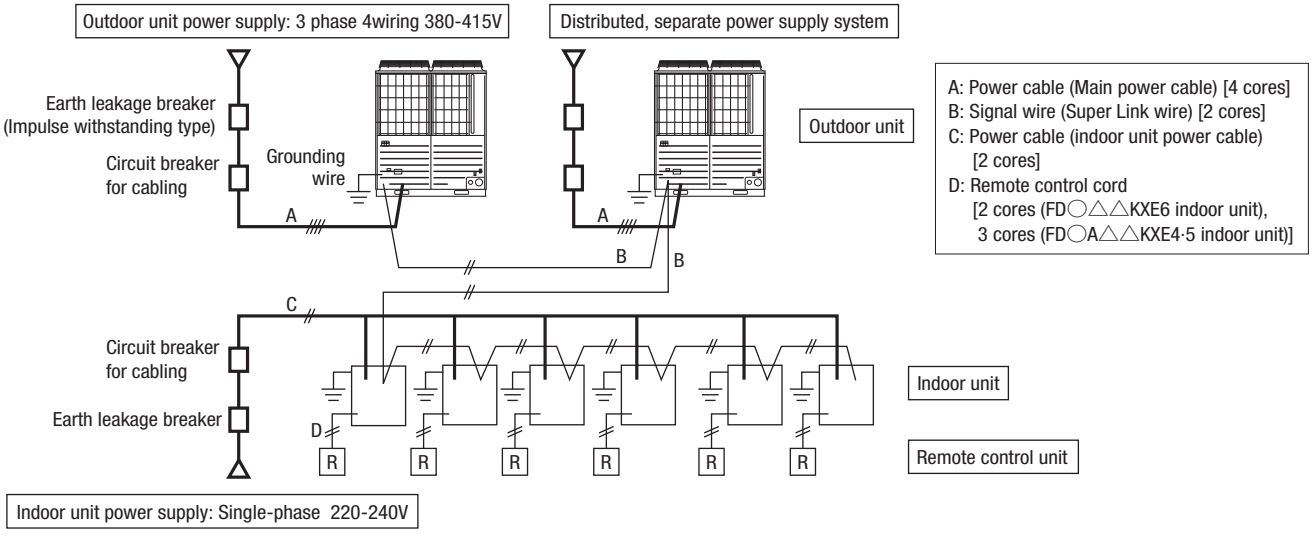
m) Make sure to use circuit breakers (earth leakage breaker and circuit breaker) of proper capacity. Use of breakers of larger capacity could result in trouble on components or fire accident.

n) Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.

o) After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

6-1. Wiring system diagrams

(Example of combination)


Outdoor unit power supply: 3 phase 4wiring 380-415V
Distributed, separate power supply system
Earth leakage breaker (Impulse withstanding type)
Circuit breaker for cabling
Grounding wire
Outdoor unit
A
B
C
D
Circuit breaker for cabling
Earth leakage breaker
Indoor unit
Remote control unit
R
A: Power cable (Main power cable) [4 cores]
B: Signal wire (Super Link wire) [2 cores]
C: Power cable (indoor unit power cable) [2 cores]
D: Remote control cord
[2 cores (FD○△△KXE6 indoor unit),
3 cores (FD○A△△KXE4·5 indoor unit)]
Indoor unit power supply: Single-phase 220-240V

CAUTION

If the earth leakage breaker is exclusively for ground fault protection, then you will need to install a circuit breaker for wiring work.

6-2. Method of connecting power cables

(1) Method of leading out cables

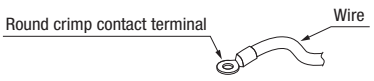
- As shown on the drawing in Section 4-2 (1), cables can be laid through the front, right, left or bottom casing.
- In wiring on the installation site, cut off a half-blank (ϕ50 or oblong hole measuring 40x80) covering a penetration of the casing with nippers.

(2) Notabilia in connecting power cables

Power cables must always be connected to the power cable terminal block and clamped outside the electrical component box.
In connecting to the power cable terminal block, use round solderless terminals.

- Connect the ground wire before you connect the power cable. When you connect a grounding wire to a terminal block, use a grounding wire longer than the power cable so that it may not be subject to tension.
- Do not turn on power until installation work is completed. Turn off power to the unit before you service the unit.
- Ensure that the unit is properly grounded.
- Always connect power cables to the power terminal block.
- To connect a cable to the power terminal block, use a round crimp contact terminal.
- Use specified wires in wiring, and fasten them securely in such a manner that the terminal blocks are not subject to external force.
- In fastening a screw of a terminal block, use a correct-size driver.
  Fastening a screw of a terminal block with excessive force can break the screw.
- For the tightening torque of terminals, refer to the list shown at right.
- When electrical installation work is completed, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection.

Tightening torque (N・m)		
M4	Outdoor signal line terminal block	0.9~1.2
M5	Power cable terminal block, Earth wire	2.00~2.35
M6	Power cable terminal block	2.5~2.8



(3) Outdoor unit power supply specifications : 3 phase 380-415V

Model	Power source	Cable size for power source (mm^2)	Wire length (m)	Moulded-case circuit breaker (A)		Earth leakage breaker	Earth wire	
				Rated current	Switch capacity		Size (mm^2)	Screw type
335-K,400	3 phase 4 wire 380-415V 50Hz/ 380V60Hz	22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
450		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
504		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
560		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
615		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
680		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5

Please note

a) The method of laying cables has been determined pursuant to the Japanese indoor wiring regulations (JEAC8001). (Please adapt it to the regulations in effect in each country)
b) In the case of distributed, separate power supply system, the listed data represent those of an outdoor unit.
c) For details, please refer to the installation manual supplied with the indoor unit.

(4) Indoor unit power supply specifications : Single phase 220-240V

Combined total capacity of indoor units	Cable size for power source (mm^2)	Wire length (m)	Moulded-case circuit breaker (For ground fault, overload and short circuit protection)	Signal wire size (mm^2)
Less than 7A	2	21	20A 100mA less than 0.1 sec	2cores x 0.75-2.0 ※
Less than 11A	3.5	21	20A 100mA less than 0.1 sec	
Less than 12A	5.5	33	20A 100mA less than 0.1 sec	
Less than 16A	5.5	24	30A 100mA less than 0.1 sec	
Less than 19A	5.5	20	40A 100mA less than 0.1 sec	
Less than 22A	8	27	40A 100mA less than 0.1 sec	
Less than 28A	8	21	50A 100mA less than 0.1 sec	

※ Please use a shielded cable.

Please note

a) The method of laying cables has been determined pursuant to the Japanese indoor wiring regulations (JEAC8001). (Please adapt it to the regulations in effect in each country)
b) Wire length in the table above is the value for when the indoor unit is connect to the power cable in series also the wire size and minimum length when the power drop is less than 2% are shown. If the current exceeds the value in the table above, change the wire size according to the indoor wiring regulations. (Please adapt it to the regulations in effect in each country)
c) For details, please refer to the installation manual supplied with the indoor unit.
d) Wires connected to indoor units are allowed up to 5.5 mm^2. For 8 mm^2 or more, use a dedicated pull box and branch to indoor units with 5.5 mm^2 or less.
e) ③ terminal on the terminal block is specified to connect only an optional auxiliary heater (power supply for heater).

6-3. Method of connecting signaling wires

The communication protocol can be choosen from following two types. One of them is the conventional Superlink (hereinafter previous SL) and the other is the new Superlink Ⅱ (hereinafter new SL) . These two communication protocols have the following advantages and restrictions, so please choose a desirable one meeting your installation conditions such as connected indoor units and centralized controller. When signal cables are connected into a network involving outdoor units, indoor units or centralized control equipment that do not support new SL, please select communications in the previous SL mode, even if the refrigerant system is separated from theirs.

Communication protocol	Conventional communication protocol (previous SL)	New communication protocol (new SL)
Outdoor unit setting (SW5-5)	ON	OFF (Factory default)
No. of connectable indoor units	Max. 48	Max. 128
No. of connectable outdoor units in a network	Max. 48	Max. 32
Signal cable (total length)	Up to 1000m	Up to 1,500 m for 0.75 mm^2 shielding wire (MVVS) Up to 1,000 m for 1.25 mm^2 shielding wire (MVVS)
Signal cable (furthest length)	Up to 1000m	Up to 1000m
Connectable units to a network	Units not supporting new SL (FD○A△△KXE4·5 series) Units supporting new SL (FD○△△KXE6 series) Can be used together.	Units supporting new SL (FD○△△KXE6 series)

Note: For FDT224 and 280 models, calculate the number of units taking 1 indoor unit as 2 units for the sake of communication.

● **Signal cables are for DC 5 V. Never connect wires for 220/240 V or 380/415 V.** Protective fuse on the PCB will trip.

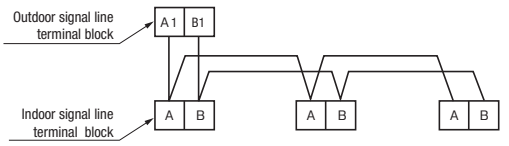
① Confirm that signal cables are prevented from applying 220/240 V or 380/415 V.

② Before turning the power on, check the resistance on the signal cable terminal block. If it is less than 100Ω, power supply cables may be connected to the signal cable terminal block.
Standard resistance value=46,000 {(Number of FD○A△△KXE4·5 Series units connected × 5) + (Number of FD○△△ KXE6 Series units connected × 9)}
If the resistance value is less than 100Ω, disconnect the signal cables temporarily to divide to more than one network, to reduce the number of indoor units on the same network, and check each network.

Indoor and outdoor units signal cables

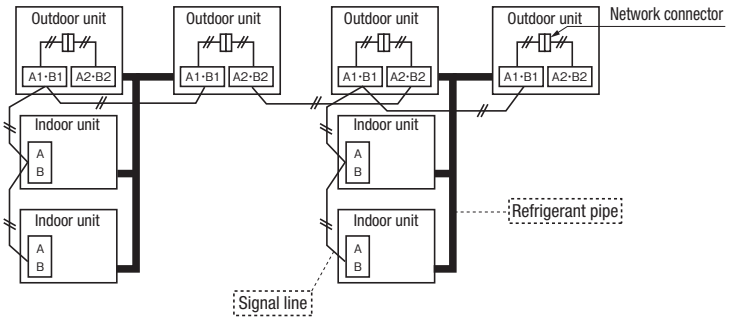
- Connect the signal cable between indoor and outdoor units and the signal cable between outdoor units belonging to the same refrigerant line to A1 and B1.
- Connect the signal line between outdoor units on different refrigerant lines to A2 and B2.
- Please use a shielded cable for a signal line and connect a shielding earth at all the indoor units and outdoor units.

(1) When one outdoor unit is used.

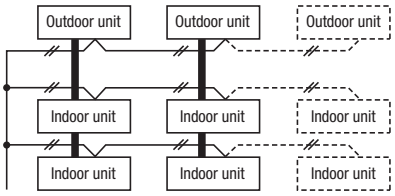


○Indoor and outdoor signal lines do not have a polarity.
Any of the connections in the following illustration can be made.

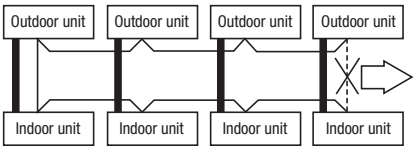
(2) When plural outdoor units are used



(3) The signal lines can also be connected using the method shown below.



Important ○Loop wiring prohibited.



The signal lines cannot form a loop, so the wirings shown as ····· in the diagram are prohibited.

Remote controller wiring specifications

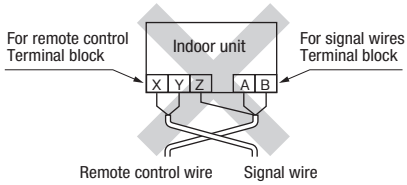
(1) **A standard remote controller wire is 0.3mm^2 x 2 cores (FDC○△△KXE6 indoor unit), 0.3mm^2 x 3 cores (FD○A△△KXE4·5 indoor unit).** It can be extended **up to 600m. For a remote controller wire exceeding 100m,** please upgrade wire size **as specified in the table below**.

Length (m)	Wire size	
	FD○△△KXE6 indoor unit	FD○A△△KXE4 indoor unit
100 to 200	0.5mm^2 × 2 cores	0.5mm^2 × 3 cores
To 300	0.75mm^2 × 2 cores	0.75mm^2 × 3 cores
To 400	1.25mm^2 × 2 cores	1.25mm^2 × 3 cores
To 600	2 mm^2 × 2 cores	2 mm^2 × 3 cores

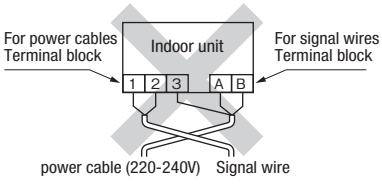
(2) When the remote controller wire runs parallel to another power supply wire or when it is subject to outside noise, such as from a high-frequency device, use shielded wire. (Be sure to ground only one end of the shielded wire.)

CAUTION In addition to a possible wiring error between indoor and outdoor units, there are other possibilities of erroneous wiring as illustrated below.

① Wrong wiring between signaling wires and remote controller wires.

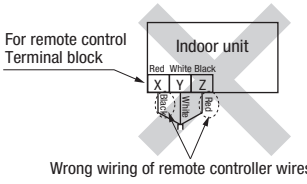


② Connecting power cables to the signaling wire terminal block.



It will result in a blown signal line fuse (CNK).

③ Wrong wiring of remote controller wires.



Error indication:E1

7. CONTROLLER SETTINGS

7-1. Unit address setting

This control system controls the controllers of more than one air conditioner's outdoor unit, indoor unit and remote control unit through communication control, using the microcomputers built in the respective controllers. Address setting needs to be done for both outdoor and indoor units. Turn on power in the order of the outdoor units and then the indoor units.

Use 1 minute as the rule of thumb for an interval between them.

The communication protocol can be chosen from following two types. One of them is the conventional communication protocol (previous SL) and the other is the new communication protocol (new SL). These two communication protocols have their own features and restrictions as shown by Table 6-3. Select them according the indoor units and the centralized control to be connected.

When signal cables are connected into a network involving outdoor units, indoor units or centralized control equipment that do not support new SL, please select communications in the previous SL mode, even if the refrigerant system is separated from theirs.

When communication is established after setting addresses, check the communication protocol with the 7 segment display panel of the outdoor unit.

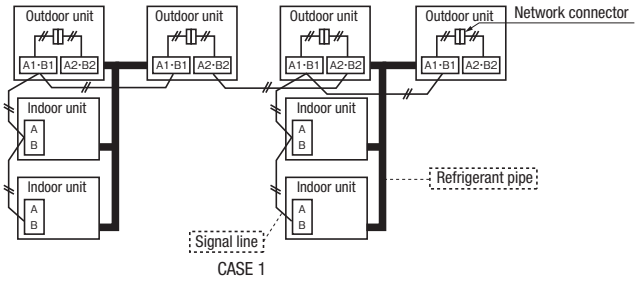
●Address setting methods

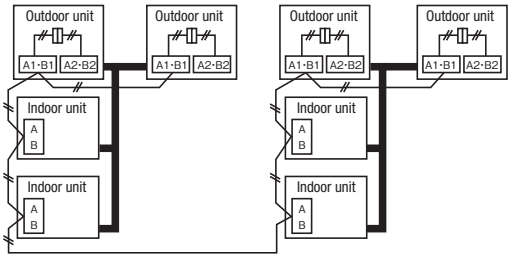
The following address setting methods can be used. The procedure for automatic address setting is different from the conventional one.
Please use the automatic address setting function after reading this manual carefully.

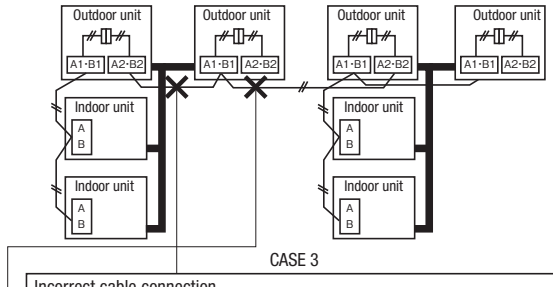
Communication protocol		new SL		previous SL	
Address setting method		Automatic	Manual	Automatic	Manual
When plural refrigerant systems are linked with signal lines (e.g., to implement centralized control)	Case 1 When signal lines linking plural refrigerant systems are provided between outdoor units. (When the network connector is disconnected, refrigerant systems are separated each other)	OK※1	OK	×	OK
	Case 2 When signal lines linking plural refrigerant systems are provided between indoor units.	×※2	OK	×	OK
When only one refrigerant system is involved (signal lines do not link plural refrigerant systems)		OK	OK	OK	OK

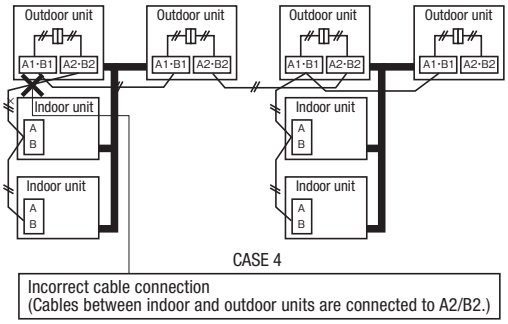
※1 Do not connect the signal line between outdoor units on the different refrigerant lines to A1 and B1. Do not connect the signal line between outdoor units on the same refrigerant line to A2 and B2. This may interrupt proper address setting. (Case 3)
Do not connect the signal line between indoor unit and outdoor unit to A2 and B2. This may interrupt proper address setting. (Case 4)

※2 In Case 2, automatic address setting is not available. Set addresses manually.





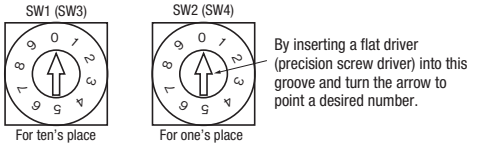

Outdoor unit
A1·B1 A2·B2
Indoor unit
A B
CASE 3
Incorrect cable connection
(Cables between outdoor units on the same refrigerant line are connected to A2/B2.)
Incorrect cable connection
(Cables between outdoor units on different refrigerant lines are connected to A1/B1.)



●Address No. setting

Set SW1 through 4 and SW5-2 provided on the PCB and SW1 & 2 provided on the outdoor unit PCB as shown in the drawings below.

Indoor PCB	SW1, 2 (blue)	For setting indoor No. (The ten's and one's)
	SW3, 4 (green)	For setting outdoor No. (The ten's and one's)
	SW5-2	Indoor No. switch (The hundred's Place) [OFF : 0, ON : 1]
Outdoor PCB	SW1, 2 (green)	For setting outdoor No. (The ten's and one's)


SW1 (SW3)
SW2 (SW4)
By inserting a flat driver (precision screw driver) into this groove and turn the arrow to point a desired number.
For ten's place
For one's place

●Summary of address setting methods (figures in [ ] should be used with previous SL)

	Units supporting new SL			Units NOT supporting new SL		
	Indoor unit address setting		Outdoor unit address setting	Indoor unit address setting		Outdoor unit address setting
	Indoor No. switch	Outdoor No. switch	Outdoor No. switch	Indoor No. switch	Outdoor No. switch	Outdoor No. switch
Manual address setting (previous SL/new SL)	000～127[47]	00～31[47]	00～31[47]	00～47	00～47	00～47
Automatic address setting for single refrigerant system installation (previous SL/new SL)	000	49	49	49	49	49
Automatic address setting for multiple refrigerant systems installation (with new SL only)	000	49	00～31	×	×	×

Do not set numbers other than those shown in the table, or an error may be generated.

Note: When units supporting new SL are added to a network using previous SL such as one involving FD○A△△KXE4·5 series units, choose previous SL for the communication protocol and set addresses manually.
Since the models FDT224 and 280 have 2 PCBs per unit, set different indoor unit No. and SW on each PCB.

- An outdoor unit No., which is used to identify which outdoor unit and indoor units are connected in a refrigerant system, is set on outdoor unit PCB and indoor unit PCB. Give the same outdoor unit No. to all outdoor unit and indoor units connected in same refrigerant system.
- An indoor unit No. is used to identify individual indoor units. Assign a unique number that is not assigned to any other indoor units on the network.

Unless stated otherwise, the following procedures apply, when new SL is chosen for the communication protocol.

When previous SL is chosen, use figures shown in [ ] in carrying out these procedures.

Manual address setting Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.

① Outdoor unit address setting

Set as follows before you turn on power. Upon turning on power, the outdoor unit address is registered.

Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

Set **the Outdoor Unit No. switch to a number 00 - 31 [in the case of previous SL: 00 - 47].**

- Similarly for the master unit used in a combined installation, set **the Outdoor Unit No. switch to a number 00-31 [in the case of previous SL:00-47].**
- Similarly for the slave unit used in a combined installation, set **the Outdoor Unit No. switch to the same number with a master unit and then, set the dipswitch SW4-7 of the slave unit to ON.** (Set both master and slave units to the same outdoor unit number.)

Refrigerant system	Outdoor unit	SW1	SW2	SW4-7	Address on a network
A	Master	2	0	OFF	20
	Slave	2	0	ON	21
B	Master	2	2	OFF	22
	Slave	2	2	ON	23
C	Master	3	1	OFF	31
	Slave	3	1	ON	00

CAUTION

A slave unit's address will be set to "the master unit's address +1." When you set a master unit's address, take care not to assign an address duplicating with one used in another system. You cannot operate the installation with a duplicating address assigned. (Error indication: E-31)

This table shows an examples of address settings. **As illustrated with the refrigerant systems A and B in the above example, when successive numbers are used in setting addresses, care must be taken so that an address assigned to the master unit of the refrigerant system B will not duplicate with one assigned to the slave unit of the refrigerant system A.**

② Indoor unit address setting

Set as follows before you turn on power. Upon turning on power, the indoor unit address is registered.

Set **the Indoor Unit No. switch to a number 000 - 127 [in the case of previous SL: 00 - 47].**

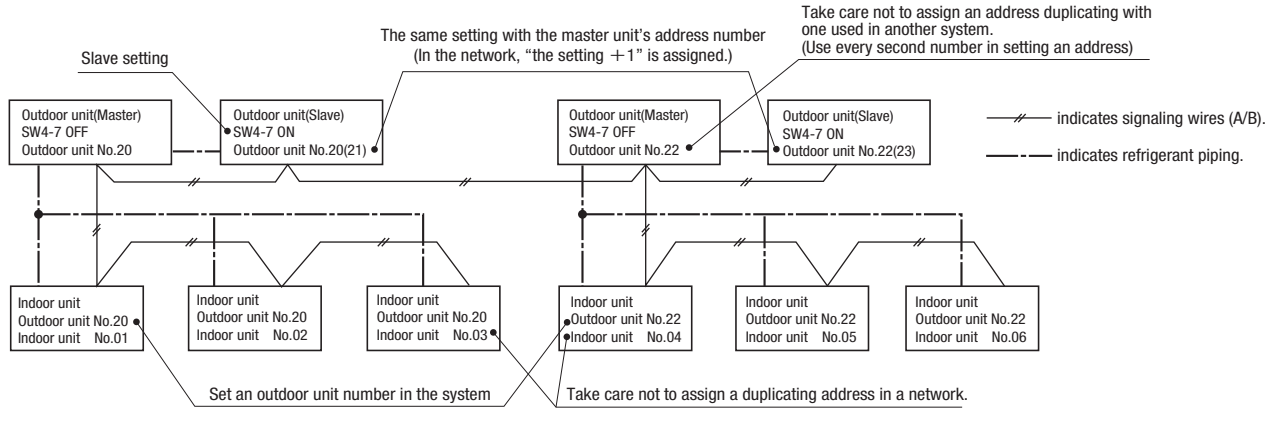
Set **the Outdoor Unit No. switch** to the outdoor unit No. of the associated outdoor unit within the range of **00 - 31 [in the case of previous SL: 00 - 47].**

Set a unique number by avoiding the numbers assigned to other indoor units on the network.

③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

* When there are some units not supporting new SL connected in the network, set SW5-5 to ON to choose the previous SL communication mode.
In the case of previous SL, the maximum number of indoor units connectable in a network is 48.

Example of address setting (manual)


Slave setting
The same setting with the master unit's address number (In the network, "the setting +1" is assigned.)
Take care not to assign an address duplicating with one used in another system. (Use every second number in setting an address)
Outdoor unit(Master) SW4-7 OFF Outdoor unit No.20
Outdoor unit(Slave) SW4-7 ON Outdoor unit No.20(21)
Outdoor unit(Master) SW4-7 OFF Outdoor unit No.22
Outdoor unit(Slave) SW4-7 ON Outdoor unit No.22(23)
indicates signaling wires (A/B).
indicates refrigerant piping.
Indoor unit Outdoor unit No.20 Indoor unit No.01
Indoor unit Outdoor unit No.20 Indoor unit No.02
Indoor unit Outdoor unit No.20 Indoor unit No.03
Indoor unit Outdoor unit No.22 Indoor unit No.04
Indoor unit Outdoor unit No.22 Indoor unit No.05
Indoor unit Outdoor unit No.22 Indoor unit No.06
Set an outdoor unit number in the system
Take care not to assign a duplicating address in a network.

Automatic address setting Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.

With new SL, you can set indoor unit addresses automatically even for an installation involving multiple refrigerant systems connected with same network, in addition to the conventional automatic address setting of a single refrigerant system installation.
However, an installation must satisfy some additional requirements such as for wiring methods, so please read this manual carefully before you carry out automatic address setting.

(1) In the case of a single refrigerant system installation (Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.)

① Outdoor unit address setting
Set as follows before you turn on power.
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting).**

- **Similarly for the master unit used in a combined installation, make sure that the Outdoor unit No. switch is set to 49 (factory setting).**
- **Similarly for the slave unit used in a combined installation, make sure that the Outdoor unit No. switch is set to 49 (factory setting). Then, set the dipswitch SW4-7 of the slave unit to ON.**

Outdoor unit	SW1	SW2	SW4-7	Address on a network
Master unit	4	9	OFF	49
Slave unit	4	9	ON	00

CAUTION
If the slave unit is not specified, a compressor failure may result.

The **master unit** will be registered as **"49"** regardless of the SW1 and SW2 settings (49).
The **slave unit** will be registered as **"00"** because of its SW4-7 setting as indicated in the table above.

② Indoor unit address setting
Set as follows before you turn on power.
Make sure that the **Indoor Unit No. switch** is set to **000 [in the case of previous SL: 49] (factory setting).**
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting).**

③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them. Unlike the procedure set out in (2) below, you need not change settings from the 7 segment display panel.

④ Make sure that the number of indoor units indicated on the 7 segment display panel agrees with the number of the indoor units that are actually connected to the refrigerant system.

(2) In the case of a multiple refrigerant systems installation (Applicable to new SL only. In the case of previous SL, set addresses with some other method.)

(This option is available when the interconnection wiring among refrigerant systems is on the outdoor side and new SL is chosen as the communication protocol.)

Address setting procedure (perform these steps for each outdoor unit)

[STEP1] (Items set before turning on power)

① Outdoor unit address setting
Set as follows before you turn on power.
Set **the Outdoor Unit No. switch** to a number **00 - 31**. Set a unique number by avoiding the numbers assigned to other outdoor units on the network.
- Similarly for the master unit used in a combined installation, set **the Outdoor Unit No. switch to a number 00-31.**
- Similarly for the slave unit used in a combined installation, set **the Outdoor Unit No. switch to the same number with a master unit and then, set the dipswitch SW4-7 of the slave unit to ON.** (Set both master and slave units on the same outdoor unit number.)

② Indoor unit address setting
Set as follows before you turn on power.
Make sure that the **Indoor Unit No. switch** is set to **000 (factory setting).**
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting).**

③ Isolate the present refrigerant system from the network.
Disengage the **network connectors (white 2P)** of the outdoor units. (Turning on power without isolating each refrigerant system will result in erroneous address setting.)

[STEP2] (Power on and automatic address setting)

④ Turn on power to the outdoor unit
Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

⑤ Select and enter "1" in P31 on the 7 segment display panel of each outdoor unit (master unit in case of combination) to input "Automatic address start."

⑥ Input a starting address and the number of connected indoor units.
Input a starting address in P32 on the 7 segment display panel of each outdoor unit (master unit in case of combination).

⑦ When a starting address is entered, the display indication will switch back to the "Number of Connected Indoor Units Input" screen.
Input the number of connected indoor units from the 7 segment display panel of each outdoor unit (master unit in case of combination). Please input the number of connected indoor units (on the same refrigerant line in case of combination) for each outdoor unit. (You can input it from P33 on the 7 segment display panel.)When the number of connected indoor units is entered, the 7 segment display panel indication will switch to "AUX" and start flickering.

[STEP3] (Automatic address setting completion check)

⑧ Indoor unit address determination

When the indoor unit addresses are all set, the 7 segment display panel indication will switch to "AUE" and start flickering.
If an error is detected in this process, the display will show "A○○."
Check the 7 segment display panel of each outdoor unit (master unit in case of combination).
Depending on the number of connected indoor units, it may take **about 10 minutes** before the indoor unit addresses are all set.

[STEP4] (Network definition setting)

⑨ Network connection
When you have confirmed an "AUE" indication on the display of each outdoor unit, **engage the network connectors** again.

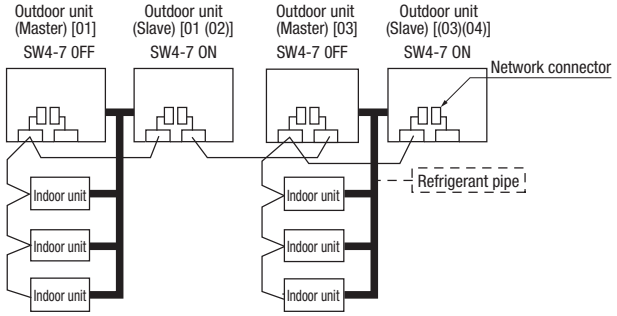
⑩ Network polarity setting

After you have made sure that the network connectors are engaged in ⑧, select and enter "1" in P34 on the 7 segment display panel of **any outdoor unit (on only 1 unit : master unit in case of combination)** to specify network polarity.

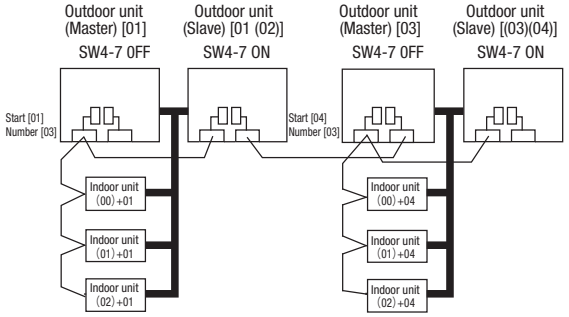
⑪ Network setting completion check
When the network is defined, "End" will appear on the 7 segment display panel. An "End" indication will go off, when some operation is made from the 7 segment display panel or 3 minutes after.

	STEP1	STEP2	STEP3	STEP4
Indoor unit power source	②OFF	④ON	—	—
Outdoor unit power source	①OFF	④ON	—	—
Indoor unit (indoor/outdoor No.SW)	②indoor000/outdoor 49 (factory setting)	—	—	—
Outdoor unit (outdoor No.SW)	①01,03(Ex)	—	—	—
Network connectors	③Disconnect(each outdoor unit)	—	—	⑨Connect(each outdoor unit)
Start automatic address setting		⑤ Select "Automatic Address Start" on each outdoor unit.		
Set starting address		⑥outdoor 01:「01」(Ex) outdoor 03:「04」(Ex)	—	—
Set the number of indoor unit		⑦outdoor 01:「03」(Ex) outdoor 03:「03」(Ex)	—	—
Polarity setting		—	—	⑩ Set in P34 on the 7 segment display panel of any outdoor unit.
7 segment display		⑦ 「AUX」 (Blink)	⑧ "AUE"(blink), or "A○○" in error events.	⑪ 「End」

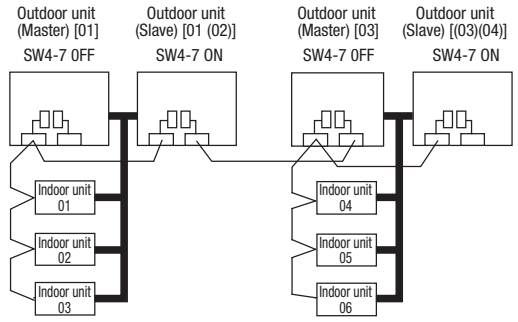
[STEP1]



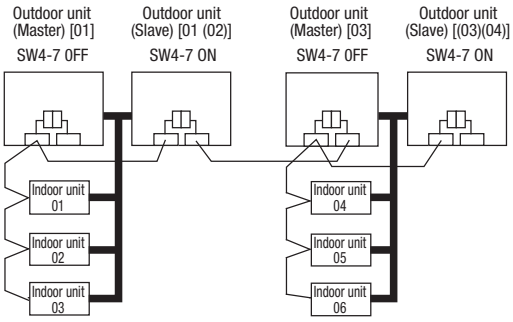
[STEP2]



[STEP3]



[STEP4]



- Within a refrigerant system, indoor units are assigned addresses in the order they are recognized by the outdoor unit. Therefore, they are not necessarily assigned addresses in order from the nearest to the outdoor unit first as depicted in drawings above.
- Make sure that power has been turned on to all indoor units.
- When addresses are set, you can have the registered indoor unit address No.'s and the outdoor unit address No. displayed on the remote control unit by pressing its CHECK button.
- Automatic address setting can be used for an installation in which prulal indoor units are controlled from one remote control unit.
- Once they are registered, addresses are stored in microcomputers, even if power is turned off.
- If you want to change an address after automatic address setting, you can change it from the remote control unit with its "Address Change" function or by means of manual setting. Set a unique address by avoiding the address assigned to other indoor unit on the network when the address is changed.
- Do not turn on power to centralized control equipment until automatic address setting is completed.
- When addresses are set, be sure to perform a test run and ensure that you can operate all indoor and outdoor units normally. Also check the addresses assigned to the indoor units.

Address change (available only with new SL)

"Address Change" is used, **when you want to change an indoor unit address assigned with the "Automatic Address Setting" function from a remote control unit.** Accordingly, the conditions that permit an address change from a remote control unit are as follows.

	Indoor unit address setting		Outdoor unit address setting
	Indoor No.SW	Outdoor No.SW	Outdoor No.SW
Automatic address setting forsingle refrigerant system installation	000	49	49
Automatic address setting for multiple refrigerant systems installation	000	49	00～31

If "CHANGE ADD. ▼" is selected with some addresses falling outside these conditions, the following indication will appear for 3 seconds on the remote controller "INVALID OPER" .

Operating procedure

(1) When single indoor unit is connected to the remote controller.

	Item	Operation	Display
1	Address change mode	① Press the AIR CON No. switch for 3 seconds or longer.	[CHANGE ADD.▼]
		② Each time when you press the ◆ switch, the display indication will be switched.	[CHANGE ADD.▼] ⇔[MASTER I/U▲]
		③ Press the SET switch when the display shows "CHANGE ADD. ▼" and then start the address change mode, changing the display indication to the "Indoor Unit No. Setting" screen from the currently assigned address.	[I/U 001 O/U 01] (1sec) →[◆ SET I/U ADD.] (1sec) →[I/U 001 ◆] (Blink)
2	To set a new indoor unit No.	④ Set a new indoor unit No. with the ◆ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔[I/U 001 ◆] ⇔[I/U 002 ◆] ⇔ ・・・ ⇔[I/U 127▼]
		⑤ After selecting an address, press the SET switch, and then the indoor unit address No. is defined.	[I/U 002] (2sec)
3	To set a new outdoor unit No.	⑥ After showing the defined indoor address No. for 2 seconds, the display will change to the "Outdoor Address No. Setting" screen. The currently assigned address is shown as a default value.	[I/U 002] (2sec Lighting) →[◆SET O/U ADD.] (1sec) →[O/U 01 ◆] (Blink)
		⑦Set a new outdoor unit No. with the ◆ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔[O/U 01 ◆] ⇔[O/U 02 ◆] ⇔ ・・・ ⇔[O/U 31▼]
		⑧ After selecting an address, press the SET switch, and then the outdoor unit No. and the indoor unit No. are defined.	[I/U 002 O/U 02] (2sec Lighting) →[SET COMPLETE] (2sec Lighting) →Returns to normal condition.

(2) When plural indoor units are connected to the remote controller.

When plural indoor units are connected, you can change their addresses without altering their cable connection.

	Item	Operation	Display
1	Address change mode	① Press the AIR CON Unit No. switch for 3 seconds or longer.	[CHANGE ADD▼]
		② Each time when you press the ◆ switch, the display indication will be switched.	[CHANGE ADD▼] ⇔[MASTER I/U▲]
		③ Press the SET switch when the display shows "CHANGE ADD. ▼" The lowest indoor unit No. among the indoor units connected to the remote control unit will be shown.	[◆SELECT I/U] (1sec) →[I/U 001 O/U 01▲] (Blink)
2	Selecting an indoor unit to be changed address	④ Pressing the ◆ switch will change the display indication cyclically to show the unit No.'s of the indoor units connected to the remote controller and the unit No.'s of the outdoor units connected with them.	[I/U 001 O/U 01▲] ⇔[I/U 002 O/U 01 ◆] ⇔[I/U 003 O/U 01 ◆] ⇔ ・・・ ⇔[I/U 016 O/U 01▼]
		⑤ Then the address No. of the indoor unit to be changed is determined and the screen switches to the display " ◆ SET I/U ADD."	[◆ SET I/U ADD.] (1sec) →[I/U 001 ◆](Blink)
3	Setting a new indoor unit No.	⑥ Set a new indoor unit No. with the ◆ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔[I/U 001 ◆] ⇔[I/U 002 ◆] ⇔ ・・・ ⇔[I/U 127▼]
		⑦ After selecting an address, press the SET switch. Then the address No.of the indoor unit is determined.	[I/U 002] (2sec)
4	Setting a new outdoor unit No.	⑧ The display will indicate the determined indoor address No. for 2 seconds and then switch to the " ◆ SET O/U ADD." screen. A default value shown on the display is the current address.	[I/U 002] (2sec lighting) ⇔[◆ SET O/U ADD.](1sec) ⇔[O/U 01 ◆] (Blink)
		⑨ Set a new outdoor unit No. with the ◆ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔[O/U 01 ◆] ⇔[O/U 02 ◆] ⇔ ・・・ ⇔[O/U 31▼]
		⑩ After selecting an address, press the SET switch. Then the address of the indoor unit and outdoor unit are determined.	[I/U 002 O/U 02](2sec lighting) →[◆ SELECT](1sec lighting) →[I/U SELECTION▼](lighting)
		⑪ If you want to continue to change addresses, return to step ④.	[Press the ◆switch](1sec) →[SET COMPLETE] (2～10sec lighting)
5	Ending the session	⑫ If you want to end the session (and reflect new address settings) In Step ⑩, press the ▼ switch to select "END ▲." If you have finished changing addresses, press the SET switch while "END ▲" is shown. While new settings are being transmitted, "SET COMPLETE" will be indicated. Then the remote controller display will change to the normal state.	[END▲] →[SET COMPLETE] (2～10sec lighting) →Normal state
		⑬ If you want to end the session (without reflecting new address settings) Before you complete the present address setting session, press the "ON/OFF" switch. Then the display is change to exit from this mode and switch the display to the normal state. All address settings changed in the session will be aborted and not reflected.	[ON/OFF] →Forced termination

The ◆switch will continuously change the display indication to the next one in every 0.25 seconds when it is pressed for 0.75 seconds or longer.
If the Reset switch is pressed during an operation, the display indication returns to the one that was shown before the last Set switch operation.
Even if an indoor unit No. is changed in this mode, the registered indoor unit No. before address change mode is displayed when [I/U SELECTION▼] is shown.
When "SET COMPLETE" is shown, indoor unit No.'s are registered.

NOTICE Turn on power to centralized control equipment after the addresses are determined.
Turning on power in wrong order may result in a failure to recognize addresses.

● 7 segment display indication in automatic address setting

Items that are to be set by the customer

Code	Contents of a display
P30	Communication protocol 0: Previous SL mode 1: New SL mode (The communication plotocol is displayed ; display only)
P31	Automatic address start
P32	Input starting address Specify a starting indoor unit address in automatic address setting.
P33	Input number of connected indoor units Specify the number of indoor units connected in the refrigerant system in automatic address setting.
P34	Polarity difinition 0: Network polarity not defined. 1: Network polarity defined.

7 segment display indication in automatic address setting.

Code	Contents of a display
AUX	During automatic address setting. X: The number of indoor units recognized by the outdoor unit.
AUE	Indoor unit address setting is completed normally.
End	Polarity is defined. (Automatic address) Completed normally.

Address setting failure indication

Code	Contents of a display	Please check
A00	Unable to find any indoor unit that can be actually communicated with.	Are signal lines connected properly without any loose connections? Is power for indoor units all turned on?
A01	The number of the indoor units that can be actually communicated with is less than the number specified in P33 on the 7 segment display panel.	Are signal lines connected properly without any loose connections? Input the number of connected indoor units again.
A02	The number of the indoor units that can be actually communicated with is more than the number specified in P33 on the 7 segment display panel.	Are signal lines connected properly without any loose connections? Are the network connectors coupled properly? Input the number of connected indoor units again.
A03	Starting address (P32) + Number of connected indoor units (P33) > 128	Input the starting address again. Input the number of connected indoor units again.
A04	While some units are operating in the previous SL mode on the network, the automatic address setting on multiple refrigerant systems is attempted.	Perform manual address setting. Separate previous SL setting unit from the network Arrange all units to operate in the new SL.

Error indication

Code	Contents of a display	Cause
E2	Duplicating indoor unit address.	・Incorrect manual address setting
E3	Incorrect pairing of indoor-outdoor units.	・An outdoor unit number that does not exist in the network is specified ・No master unit exists in combination outdoor unit.
E11	Address setting for plural remote controllers.	・Indoor unit address is set from plural remote controllers.
E12	Incorrect adderess setting of indoor units.	・Automatic address setting and manual address setting are mixed.
E31	Duplicating outdoor unit address.	・Plural outdoor units are exist as same address in same network.
E46	Incorrect setting.	・Automatic address setting and manual address setting are mixed.

7-2. Control mode switching

Controls of outdoor unit may be selected as follows using the dip switches on the PCB and C○○, P○○ on the 7-segment.
To change C○○, P○○ on the 7-segment, hold down SW8 (7-segement display increment up: 1-digit), SW9 (7-segment increment up: 10-digit) and SW7 (Data write/Enter).

Unit set※1	Control selecting method		Content of control
	SW setting on PCB	C○○, P○○ on 7-segment	
Master	SW3-2 to ON	—	Automatic back up operation
Master	SW5-1 to ON + SW5-2 to ON	—	Cooling test run
Master	Close the fluid operation valve on outdoor unit and set as follows: (1) SW5-2 on PCB to ON (2) SW5-3 on PCB to ON (3) SW5-1 on PCB to ON	—	Pump down operation
Master	SW4-5:OFF, SW4-6:OFF*2 80% (Factory default) SW4-5:ON , SW4-6:OFF*2 60% SW4-5:OFF, SW4-6:ON*2 40% SW4-5:ON , SW4-6:ON*2 00%	Set allocation of external input function to "1" *2	Inputting signals to external input terminals selects the demand mode. (J13 short-circuited: Level input, J13 open: Pulse input)
Master	SW5-5	—	Communication method selection ON: Previous SL communication, OFF: New SL communication
Master/slave	SW6-3 to ON	—	High static pressure mode
Master	J13: Short-circuited (Factory default), J13: Open	—	External input selection (CnS1, CnS2 only) Short-circuited: Level input, Open: Pulse input
Master/slave	J14: Short-circuited (Factory default), J14: Open		Defrosting mode is switched. (will enter defrosting mode more frequently)
Master/slave	J15: Short-circuited (Factory default), J15: Open	—	Defrost selection Short-circuited: Normal defrosting, Open: Forced defrosting
Master	—	C70	Operation priority selection 0: First push priority (at shipping) 1: Last push priority
Master/slave	—	C75	Outdoor unit fan snow protection control 0: Control disabled (at shipping) 1: Control enabled
	—	P11	Allocation of external input (CnS1)
	—	P12	Allocation of external input (CnS2)
	—	P13	Allocation of external input (CnG1)
	—	P14	Allocation of external input (CnG2)
Master/slave	—	P16	Outdoor unit fan snow protection control ON time setting - 30 sec (at shipping) 10, 30-600 sec

※1 "Unit set" shown in the above table refers to the master/slave setting of units comprising a combined installation.
Master: control mode setting required for the master unit only (setting not required with the slave unit).
Master/slave: control mode setting required for both master and slave units.
※2 Control is switched when both the allocation of external input function (P11~14) and SW are changed.

By changing the allocation of external input functions (P11~14) on the 7-segment, functions of external input terminals may be selected. Inputting signals to external input terminals enable the following functions.

Setting value for allocation of external input function	With external input terminals short-circuited	With external input terminals open
"0" : External operation input	Invalid	Valid
"1" : Demand input	Invalid	Valid
"2" : Cooling/heating forced input	Valid	Invalid
"3" : Silent mode input	Valid	Invalid
"4" : Spare		
"5" : Outdoor fan snow guard control input	Valid	Invalid
"6" : Test run external input 1 (equivalent to SW5-1)	Test run start	Normal
"7" : Test run external input 2 (equivalent to SW5-2)	Cooling	(Prohibited to use)
"8" : Silent mode 2	Valid	Invalid
"9" : Spare		

7-3. External input and output terminals specifications

Name	Purpose (Factory default)	Specification	Operating side connector
External input CnS1	External operation input (Short-circuited at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XAMK-1 (LF) (SN)
External input CnS2	Demand input (Short-circuited at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XARK-1 (LF) (SN)
External input CnG1	Forced cooling/heating made input (Open at shipping) "*Short-circuit prohibited"	Non-voltage contactor (DC12V)	NICHIATSU B02B-XAEK-1 (LF) (SN)
External input CnG2	Silencing mode input (Open at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XASK-1 (LF) (SN)
External output CnH	Operation output	DC12V output	MOLEX 5286-02A-BU
External output CnY	Error output	DC12V output	MOLEX 5266-02A

7-4. Exclusive cooling setting of remote controller

This air-conditioner is an exclusive cooling unit. Set it for the exclusive cooling using the remote controller as follows.
(After this setting, the unit will not operate even if the heating operation is selected on the remote controller.)

Item	Operation	Display
Function setting of wired remote controller	① Stop the air-conditioner. Then press the "SET" and "OPERATION SELECT" switches for 3 seconds or longer.	[FUNCTION SET ▼]
	② Press the "SET" switch.	[FUNCTION ▼] or [I/U FUNCTION ▼]
	③ Select the "Remote control function ▼" by pressing the ▲ or ▼ switch.	[FUNCTION ▼]
	④ Press the "SET" switch.	[DATA LOADING] (Flashes for approx. 2 seconds.) Then it changes to [GRILLE ↑↓ SET] .
	⑤ Press the ▲ or ▼ switch. (Function and number are displayed one after the other.) Select the "MODEL TYPE".	[MODEL TYPE]
	⑥ Press the "SET" switch.	[HEAT PUMP] or [COOLING ONLY]
	⑦ Select the "COOLING ONLY" by pressing ▲ or ▼ switch.	[COOLING ONLY]
	⑧ Press the "SET" switch.	[SET COMPLETE]
	⑨ Press the "Operation/Stop" switch. Setting is completed.	

- You can terminate the setting by pressing the "Operation/Stop" switch on the way of setting. Please note, however, that the setting becomes invalid unless the setting is completed.
- If you press the "RESET" switch on the way of setting, the display returns to the last previous screen.
- For further details of other settings, refer to the section of function setting included in the installation manual of the remote controller.

8. TEST OPERATION AND TRANSFER

8-1. Before starting operation

(1) **Make sure that a measurement between the power supply terminal block and ground, when measured with a 500V megger, is greater than 1 MΩ.**
(2) Please check the resistance of the signaling wire terminal block before power is turned on. If a resistance measurement is 100Ω or less, it suggests a possibility that power cables are connected to the signaling wire terminal block. (Please refer to 6-3. Standard resistance valve.)
(3) **Be sure to turn on the crank case heater 6 hours before operation.**
(4) **Make sure that the bottom of the compressor casing is warm.** (higher than outdoor temperature +5°C)
(5) Be sure to fully open the operation valves (liquid,gas and Equalizen oil piping (for a combined installation only)) for the outdoor unit.
Operating the outdoor unit with the valves closed may damage the compressor.
(6) **Check that the power to all indoor units has been turned on. If not, water leakage may occur.**

CAUTION
Please make sure that the operation valves (gas, liquid, oil equalizing pipe (for a combined installation only)) are full open before a test run. Conducing a test run with any of them in a closed position can result in a compressor failure.

8-2. Check operation

It is recommended to practice the check operation in precedent to the test run.
[Even if the check operation is not practiced, the test run and normal operations can be performed.]
For further details regarding the check operation refer to page 52.

Important

- Practice the check operation after completing the address setting for the indoor and outdoor units and also after charging the refrigerant.
- To assure accurate checking, proper amount of refrigerant must be retained.
- Check operation cannot be done when the system is stopped by an error.
- Check operation cannot be done when the total capacity of connected indoor units is less than 80% of the outdoor unit capacity.
- Check operation cannot be done when the system communication method is previous SL.
- Don't perform the check operation simultaneously on more than one refrigerant line. Accurate checking cannot be obtained.
- Practice the check operation within the operation temperature ranges (Outdoor temperature: 0 – 43°C, room temperature: 10 – 32°C). Check operation will not start out of these ranges.
- Outdoor air processing unit cannot be checked. (It is possible to check indoor units other than the outdoor air processing unit of the same refrigerant line.)

(1) Check items

Check operation allows proving the following points.

- Whether or not the operation valve is left open (Operation valve open/close check). (In case of combination, however, all operation valves need to be closed on master and slave units to obtain accurate judgment.)
- Whether or not the refrigerant pipes and signal cables are connected properly between indoor and outdoor units. (Mismatch check)
- Whether or not the indoor expansion valve operates properly. (Expansion valve failure check)

(2) Method of check operation

(a) Starting the check operation

- Confirm that all of the following switches are turned OFF: SW3-2 (Auto backup operation), SW3-6 (Pipe wash mode), SW3-7 (Forced cooling/heating mode), SW5-1 (Test run), SW5-2 (Test run cooling setting), SW5-3 (Pump-down operation) and SW5-6, -7, -8 (Capacity measurement mode). (In case of combination, on both main and slave units)
- At the next, turn the SW3-5 (Check operation) OFF → ON (only on master unit in case of combination) so that the check operation will start.
- It takes 15 – 30 minutes normally (max. 80 min) from the start to the end of check operation.

(b) End the check operation and the result display

- When the check operation is over, the system stops automatically. The 7-segment indicator shows the result (only on master unit in case of combination).

<Normal ending>

- 7-segment indicator shows "CHO End".
- Return the SW3-5 to OFF. The 7-segment indicator returns to normal display.
- Return SW3-7 (Forced cooling/heating mode) to ON.

<Abnormal ending>

- 7-segment indicator shows an error alarm.
- Referring to the section [Inspect here], repair the faulty section and return the SW3-5 to OFF.
- At the next, repeat the check operation from the Step (2) above.

Display on 7-segent indicator during check operation

Code indicato	Data indicator	Display contents
H1	Max. remaining time	Check operation preparation on. Indicates max. remaining time (min). (In case of combination, indicated on master unit only.)
H2	Max. remaining time	Check operation on. Indicates max. remaining time (min). (In case of combination, indicated on master unit only.)
HO	– – –	Check operation on. (Including preparation operation on). (Indicated only on slave unit of combination.)
CHO	End	Normal ending of check operation. (In case of combination, indicated on master unit only.)

Error display on 7-segment indicator after ending the check operation

Code indicato	Data indicator	Display contents	Check following points
CHL	– – –	Operation valve is closed. (Refrigerant circuit is shut off partially.)	• Isn't the operation valve of outdoor unit left open? • Is the low pressure sensor normal? (Detected pressure can be seen on the 7-segment indicator.) • Is the connector of indoor unit expansion valve coil connected? • Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? • Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHU	Abnormal indoor unit No.	Mismatch between refrigerant pipes and signal cables. Refrigerant is not circulated to the indoor unit of which No. is displayed.	• Are the refrigerant pipes and signal cables connected properly between the indoor and outdoor units? • Is the connector of indoor unit expansion valve coil connected? • Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? • Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHJ	Abnormal indoor unit No.	Expansion valve on the indoor unit of which No. is displayed is not operating properly.	• Is the connector of indoor unit expansion valve coil connected? • Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? • Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHE	– – –	Abnormal ending of check operation.	• Isn't any error displayed (E??) on the indoor unit or outdoor unit? • Are signal cables connected without play? • Hasn't the SW setting been changed during the check operation?
CHE	Abnormal indoor unit No.	Abnormal ending of check operation. Indoor unit of which No. is displayed is abnormal.	• Isn't any error displayed (E??) on the indoor unit or outdoor unit? • Are signal cables connected without play? • Is the power supply to the indoor unit turned on?

※ When any error is detected, errors other than those listed above may be displayed. In such occasion, refer to page 56.

8-3. Refrigerant quantity check

Refrigerant quantity check tells you whether the refrigerant quantity is excessive (over) or insufficient (low).
(Even if the check operation is not practiced, the test run and normal operation can be performed.)
For further details regarding the check operation refer to the technical data.
It must be noted that, during the check operation, the outdoor units and the indoor units are operated automatically.

Important

- **Practice the refrigerant quantity check operation only after charging the measured quantity of additional refrigerant.**
- **It is necessary to add or reduce the refrigerant depending on the result of refrigerant quantity check. Even when it has been judged that proper quantity of refrigerant is retained, the result could become inadequate if the operating conditions are changed.**
- **It should be noted, therefore, that a result under particular conditions cannot cover all operating conditions.**

(1) Guideline of accuracy

Guidelines of judgment on the refrigerant quantity are as shown below.
It should be noted that the result of judgment could vary depending on the conditions of judgment.

Refrigerant quantity over	+10 kg (Single machine) +20 kg (Combination machine)
Low refrigerant quantity	20% of the additional refrigerant quantity for piping (P)

(2) Confirmation before implementing the refrigerant quantity check

Confirm on all of the followings before starting the refrigerant quantity check.

- Confirm that it has been completed all works up to “8-1 Before starting operation”.
- Check operation cannot be done when the total capacity of connected indoor units is less than 80% of the outdoor unit capacity.
- Check operation cannot be done when the system communication method is that of previous SL.
- Check operation cannot be done when the system is stopped by an error.
- Practice the check operation within applicable operation temperature range (Outdoor temperature: 10 - 43˚C, room temperature: 15 - 32˚C). Check operation will not start out of these ranges.
- Start the check operation only at 5 minutes after stopping all indoor units.

(3) Method of refrigerant quantity check operation

(a) Starting the refrigerant quantity check operation

- Confirm that all of the following switches are turned OFF; SW3-2 (Auto backup operation), SW3-6 (Pipe wash mode), SW3-7 (Forced cooling/heating mode), SW5-1 (Test run), SW5-2 (Test run cooling setting), SW5-3 (Pump-down operation) and SW5-6, 7, 8 (Capacity measurement mode). (In case of combination, on both master/slave units)
- At the next, turn the SW3-4 (Refrigerant quantity check operation) OFF → ON (only on master unit in case of combination) so that the check operation will start.
- It takes 60 ~ 75 minutes normally from the start to the end of check operation.

(b) End of refrigerant quantity check operation and result display

- When the check operation is over, the system stops automatically, and the result is displayed on the 7-segment indicator. (Only on master unit in case of combination)

< Normal ending >

- 7-segment indicator shows “Co End”.
- Return the SW3-4 to OFF. 7-segment indicator returns to normal display.
- Return SW3-7 (Forced cooling/heating mode) to ON.

< Abnormal ending >

- 7-segment indicator shows an error alarm.
- Repair the faulty section referring to the guidance, and return the SW3-4 to OFF.
- At the next, repeat the check operation from the Step (2) above.

(4) After the refrigerant quantity check operation

Following codes may be displayed at the end of check operation, other than "Co End".
Check and take action according to the contents of remedy. And then, repeat the check operation.

Display on 7-segment indicator after the check operation (Displayed on master unit only in case of combination.)

Code indicator	Data indicator	Meaning	Remedy
Co	Hi	Refrigerant quantity over	① Too much refrigerant is charged. Reduce the quantity. < Guidelines of reduction > ・Single machine:10 kg ・Combination machine:20 kg Make sure to recover the refrigerant from the check joint of liquid pipe operation valve using the refrigerant recovery device.
Co	Lo	Low refrigerant quantity	① Refrigerant quantity is insufficient. Recharge the refrigerant. < Guideline of recharge> ・20% of the additional refrigerant quantity for piping* (Upper limit: 5 kg) Recharge the refrigerant in the liquid state from the check joint of low pressure line. Make sure to measure the quantity before recharging.
Co	H_L	Couldn't judge.	It cannot judge (a state that it cannot judge properly). State of refrigerant might have been unstable during the check operation due to influence of wind, temperature change, etc. ①Check the expansion valve of indoor unit (disconnected coil, disconnected connector or faulty expansion valve). ② Implement at a later date by changing the conditions.
Co	---	Judgment was interrupted.	Check the following points. ① Haven't you changed the setting of dip switches after the start? Return them to original setting. ② Is any error code (E??) displayed? If Yes, refer to the troubleshooting section in the technical data.
Co	HE	Starting conditions are not met.	Starting conditions are not met so that it cannot start the check operation. Refer to "(2) Confirmation before implementing the refrigerant quantity check".

※ "Additional refrigerant quantity for piping" means the value of "Additional refrigerant quantity for piping (P)" in the Section 4-4 Additional refrigerant charge.

Other errors than above may also be displayed if errors are detected. In such occasion, inspect by referring to the separate technical data.

8-4. Test operation

(1) Test run from an outdoor unit.

Whether external inputs are set to ON or OFF, you can start a test run by using the SW5-1 and SW5-2 switches provided on the outdoor unit board.
Please set SW5-2 to ON for a cooling test run (It is set to OFF at the factory for shipment)
Turning SW5-1 from OFF to ON next will cause all connected indoor units to start.
When a test run is completed, please set SW5-1 to OFF.
Note: During a test run, an indoor unit cannot be operated from the remote control unit (to change settings). ("Under centralized control" is indicated)

(2) Method of starting a test run for a cooling operation from an outdoor unit: please operate a remote control unit according to the following steps.

(a) Start of a cooling test run
○Operate the unit by pressing the [START/STOP] button.
○Select the "COOLING" mode with the [MODE] button.
○Press the [TEST RUN] button for 3 seconds or longer.
The screen display will be switched from "Select with ITEM ◆" → "Determine with [SET]" → "Cooling test run▼."
○When the [SET] button is pressed while "Cooling test run▼ " is displayed, a cooling test run will start. The screen display will be switched to "COOLING TEST RUN."

(b) Termination of a cooling test run
○When the [START/STOP] button or the "TEMP SET [▽][△]" button is pressed, a cooling test run will be terminated.

Notes : for engineers undertaking piping or electrical installation work

When a test run is completed, please make sure again that the electrical component box cover and the main body panel have been attached before you turn the unit over to the customer.

8-5. TRANSFER

○Use the instruction manual that came with the outdoor unit to explain the operation method to the customer.
Please ask the customer to keep this installation manual together with the operation manual of his indoor units.
○Instruct the customer that the power should not be turned off even if the unit is not to be used for a long time. This will enable operation of the air conditioner any time.
(Since the compressor bottom is warmed by the crank case heater, seasonal compressor trouble can be prevented.)

9. CAUTIONS FOR SERVICING (for R410A and compatible machines)

(1) To avoid mixing of different types of oil, use separate tools for each type of refrigerant.
(2) To avoid moisture from being absorbed by the ice machine oil, the time for when the refrigerant circuit is open should be kept as short as possible. (Within 10 min. is ideal.)
(3) For other piping work, airtighteness testing, vacuuming, and refrigerant charging, refer to section 3, Refrigerant piping.
(4) Diagnostic Inspection Procedures
For the meanings of failure diagnosis messages, please refer to the nameplate provided on the unit (on the back of the controller lid)
(5) 7-segment LED indication
Data are indicated when so chosen with the indication selector switch. For the details of indication, please refer to the cable name plate attached on the unit. (On the face of the controller lid)
(6) Internal wiring
After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

7 CHECK OPERATION PROCEDURE

(1) Check operation

The following ① – ③ can be checked automatically with this operation.

① Checking of operation valves opened/closed.
Checks to see if operation valves are opened.

② Checking of mismatch on wiring or piping.
Checks to see if refrigerant piping or signal wiring between indoor and outdoor units in the same refrigerant system are connected properly.

③ Checking of indoor expansion valve operation.
Checks to see if indoor expansion valve operates properly.

* Check operation should be performed before initial test run after completion of installation.
When any corrective measure for nonconformity has been taken, perform the check operation again after repair.

Operational condition

- Temperature range: Outdoor air temperature … 0 ～ 43℃, Indoor air temperature … 10 ～ 32℃.
- Connecting capacity of indoor units: 80% or more of outdoor unit capacity.

Precautions

- Check each outdoor unit system for single use or each refrigeration system for combination use.
  Outdoor units in other refrigerant system shall not be operated.
- After turning on power supply to outdoor unit and connected indoor units, start check operation with all connected indoor units stopped.
- In combination use, check the setting and the result displayed on the 7-segment display of master outdoor unit.
- If the unit has been operating before check operation, wait for 5 minutes after stopping the unit operation before starting check operation, in order to avoid misjudgment.
- In combination use, judging operation valves opened or closed by check operation can be done as no good (NG), when all of operation valves in liquid line, gas line and oil equalizing line of both master and slave outdoor units are closed. However, in other cases than the above, judgment may not be done.
- During check operation it is impossible to stop operation from remote controller. Accordingly, before starting check operation, be sure to confirm that no one working near the indoor unit especially near the rotating part such as fan of indoor unit or something is remaining near the fan of indoor unit.

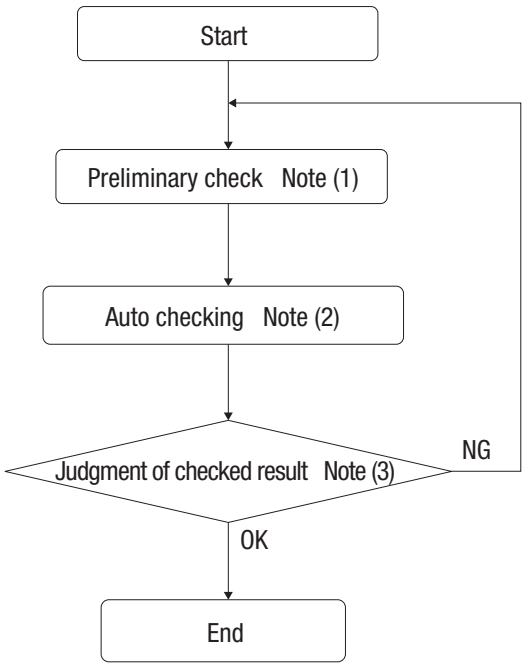
Purpose

The purpose of this check operation is only to verify any overlooked items to be checked during the ordinary checking done at the site after installation. Accordingly it has no function to substitute the ordinary checking to be done during or after installation work and to restore automatically as a result of checking operation.

Therefore be sure to conduct the checking in ordinary way after installation firstly, and then to perform this check operation. We believe that this checking method could prevent from overlooking any items to be checked.

(2) Flow of the check operation

Check operation is performed as follows.



Note (1) For preliminary check method, refer to "(3) Confirmation before check operation".

(2) For details of check operation, refer to "(4) Check operation procedure".

(3) For measures to be taken in case of NG, refer to "(5) Measures to be taken after check operation".

(3) Confirmation before check operation

- Confirm the installation has been completed properly by hearing, actual inspection or other method.
- This preliminary confirmation is indispensable to prevent troubles during or after check operation.
- Check operation can be performed only when the following conditions (1) – (8) are established.
- Check the following contents listed in the table with 7-segment display and MentePC.

	Item	Content	Check method	Check result
(1)	Preparation	Supply power to outdoor and indoor units.		
		No outdoor unit in other refrigerant systems is operating.		
		All indoor units are stopped.		
		It has elapsed more than 5 minutes after the stopping.		
(2)	Connecting capacity of indoor units	Connecting capacity of indoor units is 80% or more of outdoor unit capacity.	Check capacities of outdoor and indoor units.	
(3)	Address setting	Addresses of outdoor unit (in combination use, both of master and slave outdoor units) and indoor units have been set.	Check the number of connected units.	
(4)	Temperature range	Outdoor air temperature is 0 – 43℃. Indoor air temperature is 10 – 32℃.	Check outdoor air temperature with 7-segment display and indoor air temperature with MentePC.	
(5)	Others	System communicating method is of new SL.	Check the model name of outdoor unit, indoor units, central control device, etc.	
		System is not in error stop condition.	Check to see if any error code (E??) is displayed on indoor or outdoor unit.	
(6)	Outdoor unit operation valve	Outdoor unit operation valve is opened. *1	Check visually.	
(7)	Refrigerant amount	Proper amount of refrigerant is charged.	Check the additional charged amount of refrigerant is written in the plate for specifying refrigerant charging amount on the back of outdoor service panel.	
(8)	Number of connected indoor units	It is same as the number of connected indoor units installed.	Check with 7-segement display or MentePC.	

*1 - Be sure to open the operation valves in both liquid and gas lines of outdoor unit before starting check operation. In combination use, open the operation valves not only in liquid and gas lines but also in oil equalizing line of both master and slave outdoor units.
- Operating with operation valves closed causes vacuum operation that results in a compressor fault.
- If the operation valves are “closed” before test run, be sure to verify whether the evacuation, air tightness test and additional refrigerant charge have been completed by hearing to installation contractor, before opening the operation valves.

  ⇒ Otherwise, it may cause such trouble as mixing air (non-condensation gas and water) in, forgetting to charge additional refrigerant at the site, or others.

(4) Check operation procedure

Flow	Work	Operation status (Displayed on 7-segment)	Meaning of 7-segment display	Remarks
Preliminary check	Check in advance as per "(3) Confirmation before check operation".			Don't operate any outdoors unit in other refrigerant systems during check operation.
Start of check operation	Turn "Chek operation switch (SW3-5)" on outdoor control PCB from OFF to ON. In combination use, turn "Chek operation switch (SW3-5) on master control PCB from OFF to ON.	"H1 Max. remaining time"	Remaining time: Max. remaining time for check operation	This operation status is displayed during preparation for check operation. Depending on conditions, it may not be displayed. In combination use, "H0---" is displayed on the slave outdoor unit. *Be sure to start check operation when all indoor units are stopping.
		"H0 HE"	When "H0-HE" is displayed for more then 10 minutes, then check operation is not started yet. In such case refer to "(3) confirmation before check	
Implementing auto checking		"H2 Max. remaining time"	Remaining time: Max. remaining time for auto checking.	In combination use, "H0---" is displayed on the slave outdoor unit.
End of auto checking, judgment result	Record the indication of 7-segment indicator on outdoor unit.	"CH0 End"	Result of check operation is judged normal.	End the check operation.
		"CHL---"	Operation valve may be closed.	Refer to "(5) Measures to be taken after check operation".
		"CHU Anomalous indoor unit No."	Refrigerant piping or signal wiring between indoor and outdoor units may not be connected correctly.	
		"CHJ Anomalous indoor unit No."	Indoor expansion valve may not be operating properly.	
		"CHE---"	Check operation has not ended properly. All judgment results at the end are displayed.	
		Other display		
Check of nonconforming item	Check for anomalous condition as per "(5) Measures to be taken after check operation"		When any display other than "CH0-End" is displayed after auto checking.	Refer to "(5) Measures to be taken after check operation".
End of check operation	Turn off "Chek operation run switch (SW3-5)" on outdoor control PCB.		Returns to normal display.	

Notes (1) When "H0-HE" is displayed for more than 10 minutes, or any displays other than "CH0-End" is displayed at the end of cheek operation, turn SW3-5 to OFF and take necessary measures.
And then turn SW3-5 to ON again and perform the check operation.

(2) During check operation it is impossible to stop operation from remote controller. Accordingly, before starting check operation, be sure to confirm that no one working near the indoor unit especially near the rotating part such as fan of indoor unit or something is remaining near the fan of indoor unit.
When interrupting check operation, turu SW3-5 to OFF, Compressor stops and 7-segment display returns to normal display.

(5) Measures to be taken after check operation

When any display other than “CHO-End” is displayed after completing the judgment of check operation, the meanings of each display are shown as follows.

After checking the contents of inspection and repairing nonconforming items, perform check operation again.

Code display	Data display	Meaning of display	Contents of Inspection
CHL	---	Refrigerant circuit is choked at certain place.	Operation valve on outdoor unit may be left closed.
			Low pressure sensor may be anomalous. Check the detected pressure displayed on 7-segment and compare it with the value measured with gauge manifold.
			Refrigerant piping or signal wiring may not be connected properly. *1 (See page 58.) Check with Mente PC, etc.
			Indoor heat exchanger temperature thermistor may be anomalous or disconnected. *2 (See page 58.)
			Refrigerant may not be charged correctly.
			Indoor unit expansion valve may not be operating properly. Connector of indoor unit expansion valve coil may not be connected. *3 (See page 58.) Indoor unit expansion valve coil may be disconnected from main body of expansion valve. *4 (See page 58.)
			Outdoor unit PCB may be defective.
CHU	Anomalous indoor unit No.	Refrigerant is not circulated in the indoor unit of indicated No.	Refrigerant piping or signal cables may not be connected properly between indoor and outdoor units. *1 (See page 58.) Check with Mente PC, etc.
			Indoor heat exchanger temperature thermistor may be anomalous or disconnected. *2 (See page 58.)
			Operation valve on outdoor unit may be left closed. Check it especially when many indoor units No. are displayed in data display column of CHU.
			it may be displayed by influence of liquid flooding due to the trouble on any other indoor unit. If CHJ is displayed at the same time, check preferentially the indoor unit displaying CHJ and after repairing, perform check operation again.
			Refrigerant may not be charged correctly.
			Indoor unit expansion valve may not be operating properly. Connector of indoor unit expansion valve coil may not be connected. *3 (See page 58.) Indoor unit expansion valve coil may be disconnected from main body of expansion valve. *4 (See page 58.)
CHJ	Anomalous indoor unit No.	Expansion valve on the indoor unit of indicated No. does not operate properly.	Indoor heat exchanger temperature thermistor may be anomalous or disconnected. *2 (See page 58.)
			it may be displayed by influence of liquid flooding due to the trouble on any other indoor unit.
			Contamination may be trapped in expansion valve due to installation or transitional cause.
			Indoor unit expansion valve may not be operating properly. Connector of indoor unit expansion valve coil may not be connected. *3 (See page 58.) Indoor unit expansion valve coil may be disconnected from main body of expansion valve. *4 (See page 58.)
			Refrigerant may not be charged correctly.
CH1	---	Indoor heat exchanger temperature anomaly.	Indoor heat exchanger temperature thermistor may be anomalous or disconnected. *2 (See page 58.)
CH3	---	Unable to do indoor EEV trouble check.	Unable to do indoor EEV trouble check because of unstable operation.

Code display	Data display	Meaning of display	Contents of Inspection
CHH	---	It may be liquid flooding.	Refrigerant piping or signal cables may not be connected properly between indoor and outdoor units. *1 (See next page.)
			Power switch may be turned off on some indoor units. Check if power is supplied to all indoor units.
			Indoor unit expansion valve may not be operating properly. Connector of indoor unit expansion valve coil may not be connected. *3 (See next page) Indoor unit expansion valve coil may be disconnected from main body of expansion valve. *4 (See next page.) If no indoor unit indicates CHJ, check also indoor units which are not showing CHJ.
			Refrigerant may not be charged correctly.
CHE	---	Anomalous stop of check operation.	Some error may happen on indoor or outdoor units. Check if any error code "E??" is displayed on indoor or outdoor units.
			There may be anomalous on signal wire connection. Check if signal wire is connected firmly.
			SW setting on outdoor PCB might have been changed. Check if any SW setting has been changed during check operation.
CHE	Anomalous indoor unit No.	Anomalous stop of check operation. Indoor unit indicated its No. has anomaly.	Some error may happen on indoor or outdoor units. Check if any error code "E??" is displayed on indoor or outdoor units.
			There may be anomalous on signal wire connection. Check if signal wire is connected firmly.
			Power switch may be turned off on some indoor units. Check if power is supplied to indoor units.
E	40	High pressure anomaly.	Refrigerant circuit may be choked at a certain place. Refer to the technical manual or the above.
E	42	Current cut.	Refrigerant circuit may be choked at a certain place. Refer to the technical manual or the above.
			It might have been started operation while bottom of compressor was still cold. Perform check operation again after the bottom of compressor has been enough warm.
E	49	Low pressure anomaly.	Refrigerant circuit may be choked at a certain place. Refer to the technical manual or the above.
E	36-3	Liquid flooding anomaly.	It may be in the same condition as "CHH---". Refer to the technical manual or the above.

Note (1) When an error code (E??) is displayed, press SW9 to display all indicalions other than the error code in series. Press SW9 again to return to error display.

(2) When check operation has been suspended, the followings listed in below table are displayed depending on judgment at the time of stoppage.

Code display	Data display	Contents of display
HL	---	Refrigerant circuit is choked at a certain place.
HL	LPL	Refrigerant circuit is choked at a certain place. (In combination use)
HU	Anomalous indoor unit No.	Refrigerant is not circulated in the indoor unit of indicated No.
HJ	Anomalous indoor unit No.	Expansion valve does not operate on the indoor unit of indicated No.
UU	Anomalous indoor unit No.	Refrigerant is not circulated in the indoor unit of indicated No.
U	Anomalous indoor unit No.	Refrigerant was not circulated in the indoor unit of indicated No. just after starting but it has been confirmed that it is now circulated.

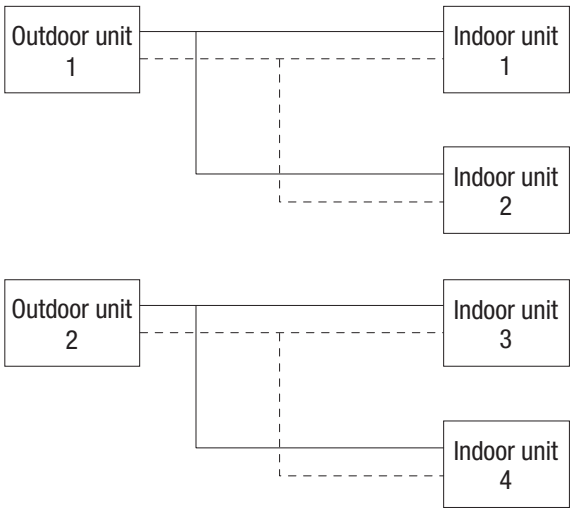
(3) If refrigerant circuit is choked at a certain place, it may be stopped with error code E40 (High pressure anomaly), E42 (Current cut) or E49 (Low pressure anomaly).

(4) When it has stopped with error code E36-3 (Liquid flooding anomaly), it may be in the same condition as "CHH---".

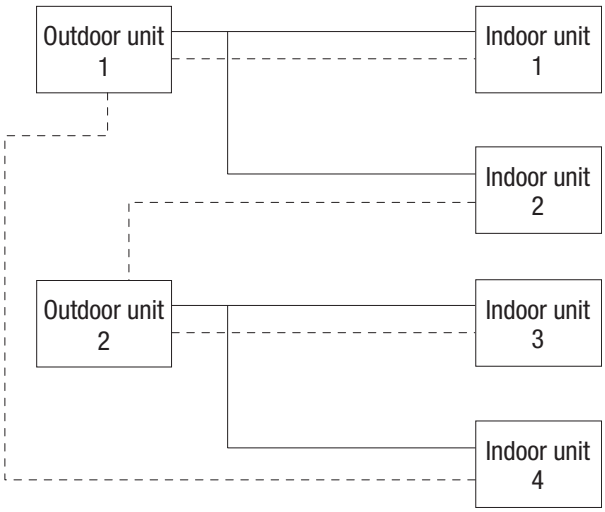
(5) When it has stopped with error code E42 (Current cut), it might have been started operation while bottom of compressor was still cold. Perform check operation again after the bottom of compressor has been enough warm.

*1 ——————— Piping
- - - - - - - - - - - - - - - Wiring

▪ Normal



▪ Wrong wiring



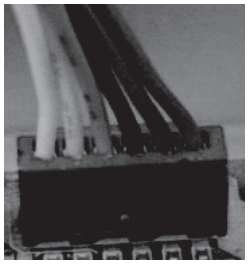
*2 (If the connector comes off by a weak pull, it's no good. If not come off, It's OK)
The connector of indoor heat exchanger temperature thermistor.

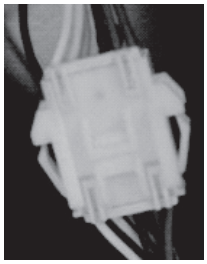
Normal

Disconnected

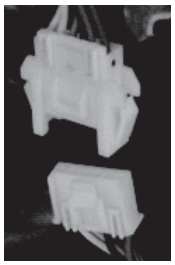
*3 (If the connector comes off by a weak pull, it's no good. If not come off, It's OK)
The connector of indoor expansion valve coil.

Normal



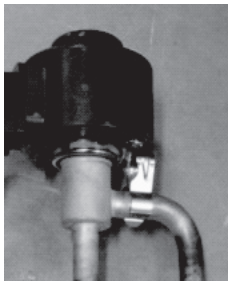


Disconnected

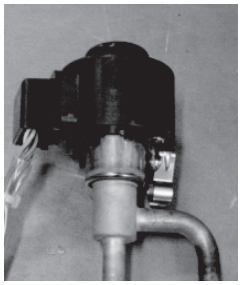


*4
The indoor expansion valve coil itself.

Normal



Disconnected from main body



(6) Data sheet

<Check Operation Data Sheet>

Project name		Location	

		Fill necessary data in advance	
		Model	Address
Outdoor unit	Master	FDC	
	Slave	FDC	

Superlink version
Superlink II
Superlink I*

* In case of Superlink I, the check operation cannot be implemented.

Date of installation	(d/m/y)
Name of installer	

Checked by	
Date of checking	(d/m/y)
Weather	
Outdoor air temperature	℃
Start time of check operation	(h/m/)
Completion time of check operation	(h/m/)

	Fill necessary data in advance									
	No.	Model	Address	Piping length O/U-I/U	Elevation difference O/U-I/U	No.	Model	Address	Piping length O/U-I/U	Elevation difference O/U-I/U
Indoor unit	1	FD				41	FD			
	2	FD				42	FD			
	3	FD				43	FD			
	4	FD				44	FD			
	5	FD				45	FD			
	6	FD				46	FD			
	7	FD				47	FD			
	8	FD				48	FD			
	9	FD				49	FD			
	10	FD				50	FD			
	11	FD				51	FD			
	12	FD				52	FD			
	13	FD				53	FD			
	14	FD				54	FD			
	15	FD				55	FD			
	16	FD				56	FD			
	17	FD				57	FD			
	18	FD				58	FD			
	19	FD				59	FD			
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	22	FD				62	FD			
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	24	FD				64	FD			
	25	FD				65	FD			
	26	FD				66	FD			
	27	FD				67	FD			
	28	FD				68	FD			
	29	FD				69	FD			
	30	FD				70	FD			
	31	FD				71	FD			
	32	FD				72	FD			
	33	FD				73	FD			
	34	FD				74	FD			
	35	FD				75	FD			
	36	FD				76	FD			
	37	FD				77	FD			
	38	FD				78	FD			
	39	FD				79	FD			
	40	FD				80	FD			

【Judgment】

Checked items	Result
① No anomaly allowed. → If anomaly occurred: Error code E-	
② 7-segment display at completion	
③ Others (Comment/Measures to be taken/etc.)	

2 OUTDOOR UNIT

2.1 Specifications

• Single use (Used also for combination)

Models			FDCH335CKXE6G-K	FDCH400CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G	FDCH560CKXE6G	FDCH560CKXE6G-K	FDCH615CKXE6G	FDCH680CKXE6G
Nominal cooling capacity*1		kW	33.5	40.0	45.0	50.4	56.0	56.0	61.5	68.0
Nominal heating capacity*2			–	–	–	–	–	–	–	–
Power source			3 Phase 380–415V 50Hz/380V 60Hz							
Power consumption	Cool	kW	8.94	11.27	12.97	14.73	16.79	16.79	20.37	24.98
	Heat		–	–	–	–	–	–	–	–
Running current	Cool	A	14.5/13.3	18.4/16.9	21.1/19.3	24.1/22.0	27.4/25.1	27.4/25.1	33.1/30.3	40.3/36.9
	Heat		–	–	–	–	–	–	–	–
Power factor	Cool	%	94/94	93/93	93/93	93/93	93/93	93/93	94/94	94/94
	Heat		–	–	–	–	–	–	–	–
Sound Pressure Level		dB (A)	59/–	59.5/–	62.5/–	61.5/–	63/–	63/–	64.5/–	65/–
Exterior dimensions Height X Width X Depth		mm	1690X1350X720			2048X1350X720				
Net weight		kg	326			358		377		
Refrigerant equipment compressor type & Q'ty			GTC5150NH48LX2					GTD5160NH48LX2		
Motor		kW	2.99X2	3.71X2	4.29X2	4.87X2	5.78X2		6.66X2	7.15X2
Starting method			Direct line starting							
capacity control		%	19–130	15–114	13–112	11–100	10–113	12–113	11–110	10–108
Crankcase heater		W	33X2							
Refrigerant equipment Heat exchanger			Straight fin & inner grooved tubing							
Refrigerant control			Electronic expansion valve							
Refrigerant			R410A							
Quantity		kg	11.5							
Refrigerant oil		l	4.2 (M-MA32R)							
Defrost control			Microcomputer controlled De-Icer							
Air handling equipment fan type & Q'ty			Propeller fan X 2							
Motor		W	386X2							
Starting method			Direct start							
Air flow (Standard)		CMM	220/–	250/–	260/–	270/–				
Static pressure		Pa	Max.50							
Shock & vibration absorber			Rubber mount (for compressor)							
safety equipment			Compressor overheat protection / overcurrent protection / power transistor overheating protection / abnormal high pressure protection							
Installation data Refrigerant piping size		mm (in)	Liquid line : ϕ12.7 (1/2")			Liquid line : ϕ15.88 (5/8")				
			Gas line : ϕ25.4 (1")			Gas line : ϕ28.58 (11/8")				
Connecting method			Gas line : Brazing / Liquid line : Flare							
MAX. Pressure		MPa	High 4.15 Low 2.21							
Drain			Hole for drain (ϕ20 X 10pcs , ϕ45 X 3pcs)							
Insullation for piping			Necessary (both Liquid & Gas lines)							
Accessories			–	–	–	–	–	–	–	–

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
Operation	DB	WB	DB	WB	
Cooling*1	27 ℃	19 ℃	35 ℃	24 ℃	ISO-T1
Heating*2	20 ℃	-	7 ℃	6 ℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Adapted to RoHS directive

PCB003Z587

'09•KX-T-139

#

Models			FDCH735CKXE6G	FDCH800CKXE6G	FDCH850CKXE6G	FDCH900CKXE6G	FDCH960CKXE6G	FDCH1010CKXE6G
Combination unit			FDCH335CKXE6G-K	FDCH400CKXE6G	FDCH400CKXE6G	FDCH450CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G
			FDCH400CKXE6G	FDCH400CKXE6G	FDCH450CKXE6G	FDCH450CKXE6G	FDCH504CKXE6G	FDCH504CKXE6G
Power source			3 Phase 380–415V 50Hz/380V 60Hz					
Nominal cooling capacity*1		kW	73.5	80.0	85.0	90.0	96.0	101.0
Nominal heating capacity*2			–	–	–	–	–	–
Power consumption	Cool	kW	20.21	22.54	24.24	25.94	27.7	29.46
	Heat		–	–	–	–	–	–
Running current	Cool	A	32.9/30.2	36.8/33.8	39.5/36.2	42.2/38.6	45.2/41.3	48.2/44
	Heat		–	–	–	–	–	–
Power factor	Cool	%	93/93	93/93	93/93	93/93	93/93	93/93
	Heat		–	–	–	–	–	–
Net weight		kg	652	652	652	652	684	716
Refrigerant piping size	Liquid line	ϕmm	ϕ19.05					
	Gas line		ϕ31.75					
	Oil equalization		ϕ9.52					

Models			FDCH1065CKXE6G	FDCH1130CKXE6G	FDCH1180CKXE6G	FDCH1235CKXE6G	FDCH1300CKXE6G	FDCH1360CKXE6G
Combination unit			FDCH504CKXE6G	FDCH560CKXE6G	FDCH560CKXE6G-K	FDCH615CKXE6G	FDCH615CKXE6G	FDCH680CKXE6G
			FDCH560CKXE6G	FDCH560CKXE6G	FDCH615CKXE6G	FDCH615CKXE6G	FDCH680CKXE6G	FDCH680CKXE6G
Power source			3 Phase 380–415V 50Hz/380V 60Hz					
Nominal cooling capacity*1		kW	106.5	113.0	118.0	123.5	130.0	136.0
Nominal heating capacity*2			–	–	–	–	–	–
Power consumption	Cool	kW	31.52	33.58	37.16	40.74	45.35	49.96
	Heat		–	–	–	–	–	–
Running current	Cool	A	51.5/47.1	54.8/50.2	60.5/55.4	66.2/60.6	73.4/67.2	80.6/73.8
	Heat		–	–	–	–	–	–
Power factor	Cool	%	93/93	93/93	93/93	94/94	94/94	94/94
	Heat		–	–	–	–	–	–
Net weight		kg	716	716	754	754	754	754
Refrigerant piping size	Liquid line	ϕmm	ϕ22.22					
	Gas line		ϕ38.1					
	Oil equalization		ϕ9.52					

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
Operation	DB	WB	DB	WB	
Cooling*1	27 ℃	19 ℃	35 ℃	24 ℃	ISO-T1
Heating*2	20 ℃	-	7 ℃	6 ℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Adapted to RoHS directive

PCB003Z587

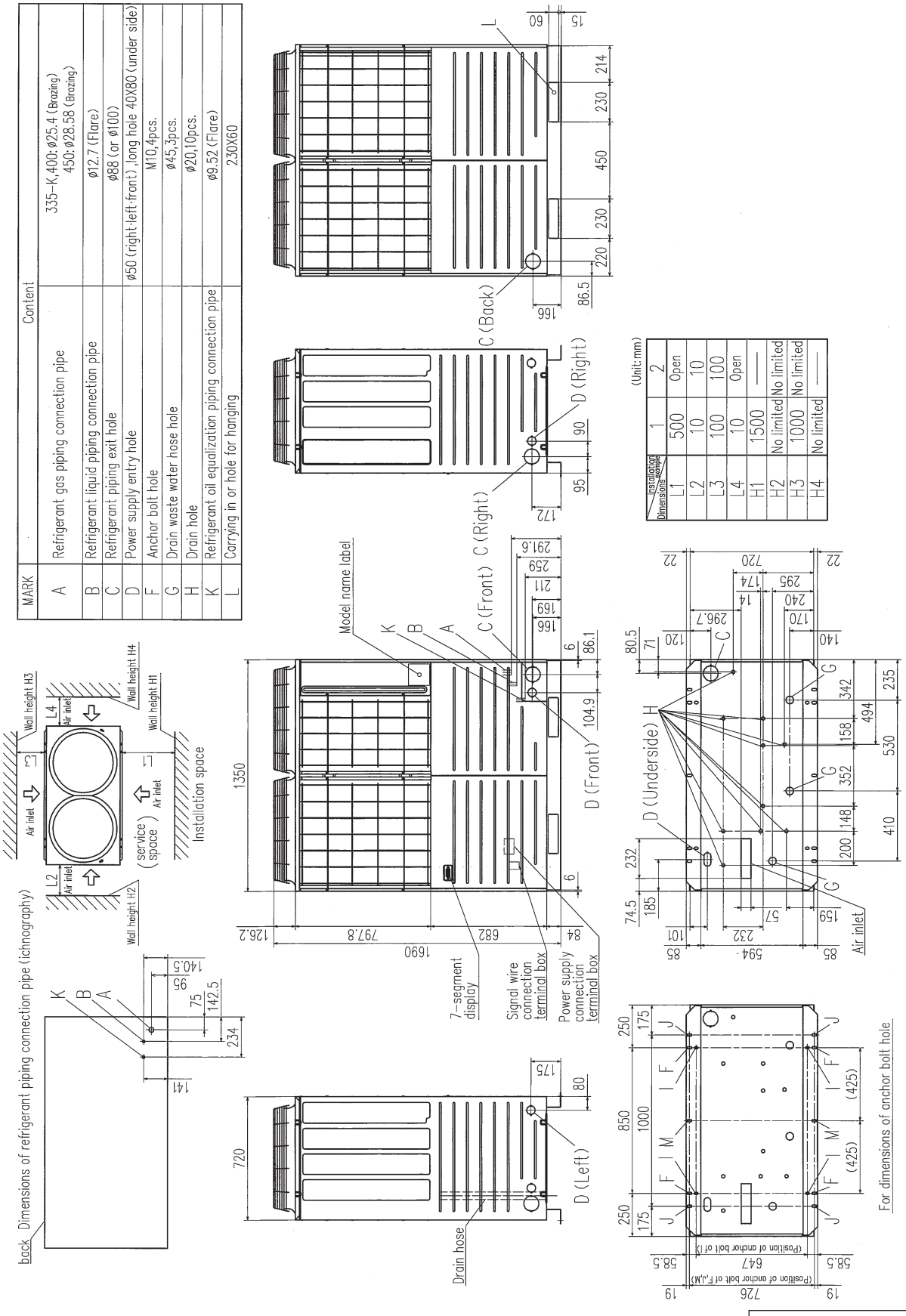
2.2 Exterior dimensions

Models FDCH335CKXE6G-K, 400CKXE6G, 450CKXE6G

MARK	Content	
A	Refrigerant gas piping connection pipe	335-K, 400: ø25.4 (Brazing) 450: ø28.58 (Brazing)
B	Refrigerant liquid piping connection pipe	ø12.7 (Flare)
C	Refrigerant piping exit hole	ø88 (or ø100)
D	Power supply entry hole	ø50 (right·left·front), long hole 40X80 (under side)
F	Anchor bolt hole	M10, 4pcs.
G	Drain waste water hose hole	ø45, 3pcs.
H	Drain hole	ø20, 10pcs.
K	Refrigerant oil equalization piping connection pipe	ø9.52 (Flare)
L	Carrying in or hole for hanging	230X60

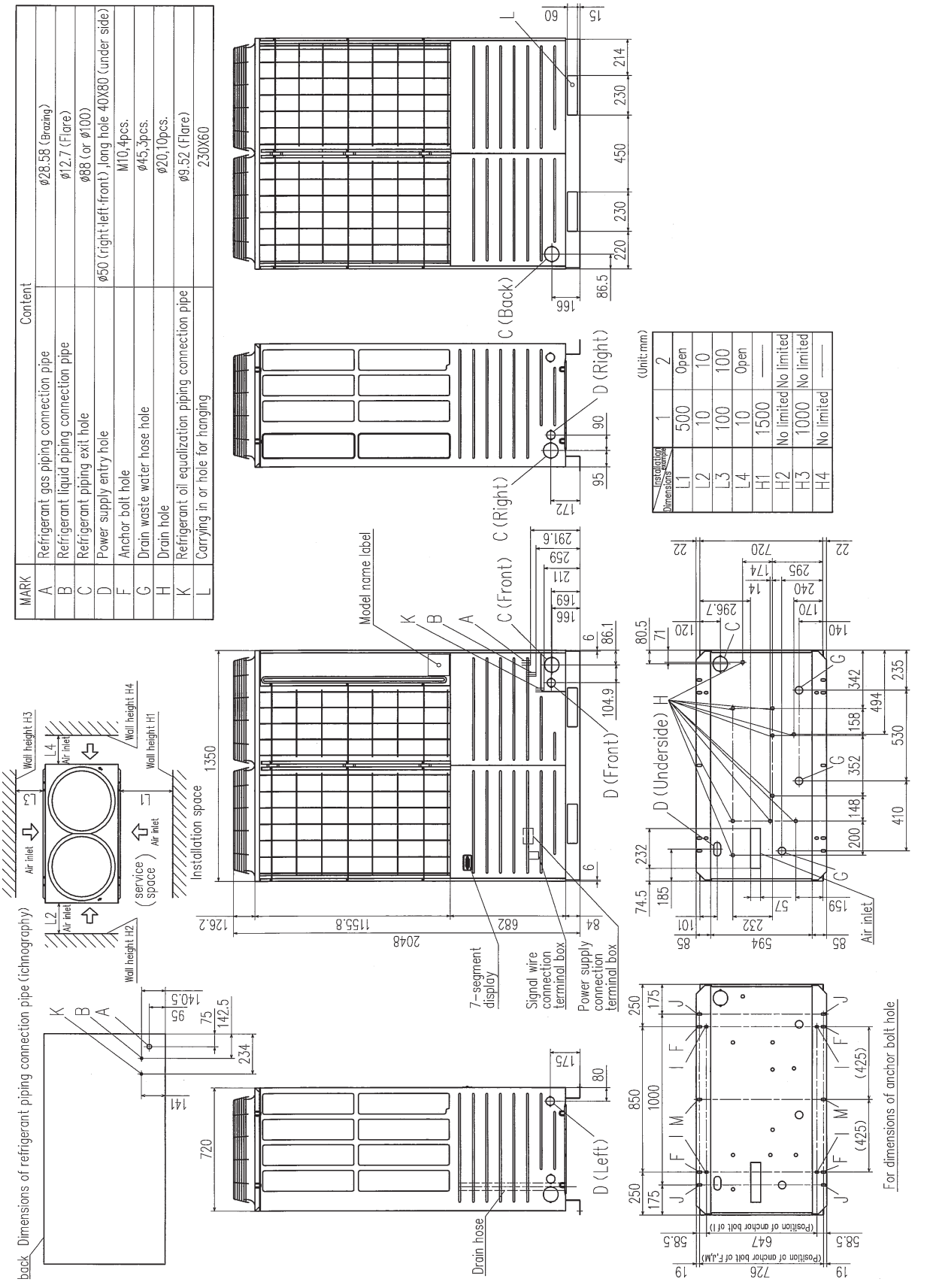
(Unit: mm)

Installation service Dimensions	1	2
L1	500	Open
L2	10	10
L3	100	100
L4	10	Open
H1	1500	—
H2	No limited	No limited
H3	1000	No limited
H4	No limited	—



PCB003Z589

Models FDCH504CKXE6G, 560CKXE6G, 560CKXE6G-K, 615CKXE6G, 680CKXE6G

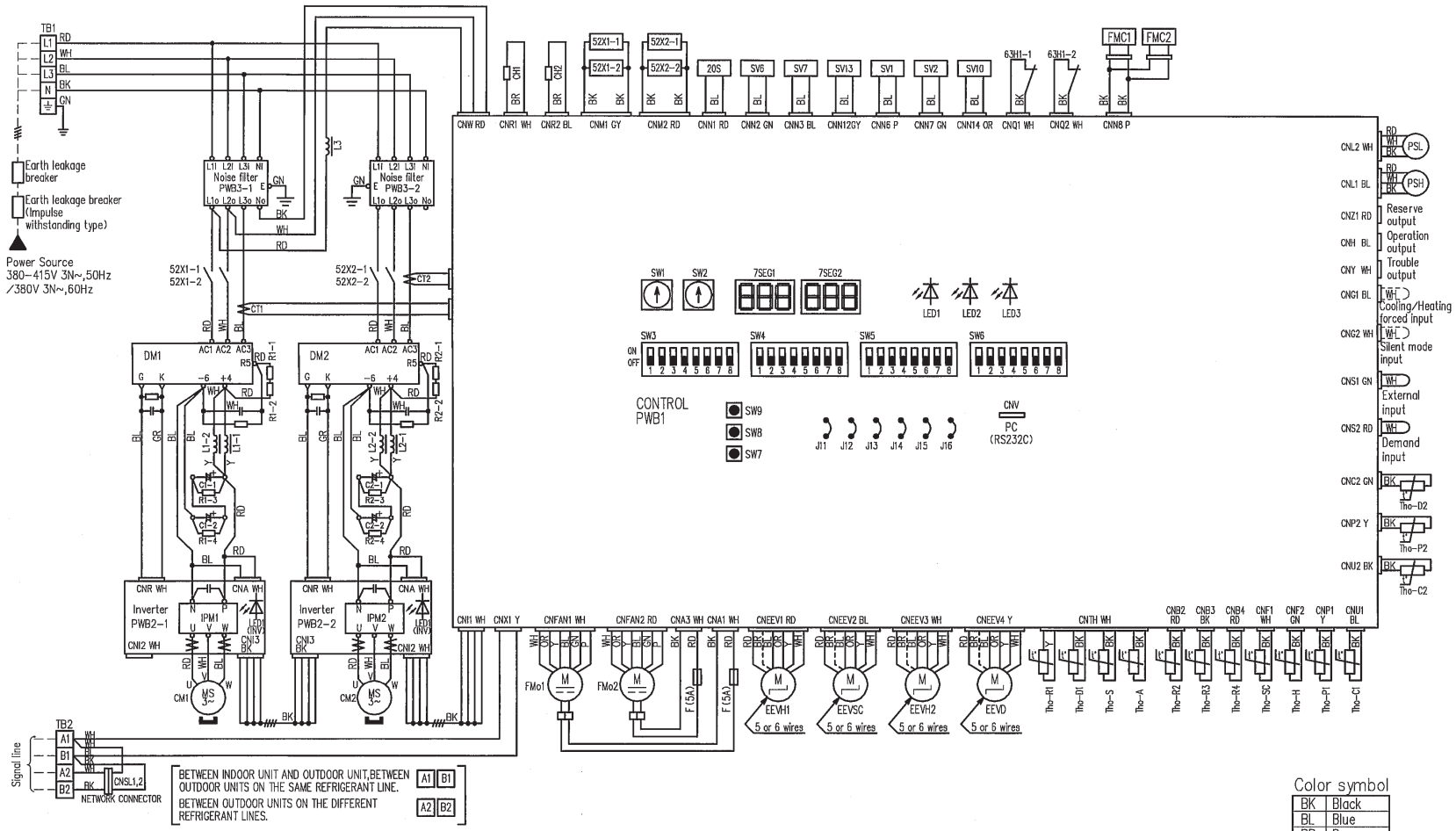


PCB003Z590

#

2.3 Electrical wiring

Models All model



Color symbol

BK	Black
BL	Blue
BR	Brown
GN	Green
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
P	Pink

CH1,2	Crankcase heater
CM1,2	Compressor motor
CNA–Z	Connector
CT1,CT2	Current sensor
C1–1,2,C2–1,2	Electrolytic capacitor
DM	Diode module
EEVH1,2	Expansion valve for heating
EEVSC	Expansion valve for SC
EEVD	Expansion valve for decompression
F	Fuse
FMC1,2	Fan for IPM
FMo1,2	Blower motor
IPM	Intelligent power module
J11,12	Set up model (volt)
J13	External input select level/pulse
J14	Defrost recover temp
J15	Defrost start temp
J16	Heat recovery unit
LED1	Inspection (Red)
LED1 (INV)	Normal (Yellow) –Flashing
LED2	Normal (Green)
LED3	Service (green for service)
L1–1,2,L2–1,2	D.C.reactor
L3	D.C.reactor

PSH	High pressure sensor
PSL	Low pressure sensor
PWB1~3	Printed wiring board (PCB)
R1,2	Rush current suppression resistor
SA	Arrestor
SV1	Solenoid valve (CM1 bypass)
SV2	Solenoid valve (CM2 bypass)
SV6	Solenoid valve (oil separator CM1)
SV7	Solenoid valve (oil separator CM2)
SV10	Solenoid valve (decompression)
SV13	Solenoid valve (gas bypass)
SW1	Address setting SW outdoor unit No. (2 digits)
SW2	Address setting SW outdoor unit No. (1 digit)
SW3–1	inspection LED reset
SW3–2 ON	Auto backup operation
OFF	Regular operation
SW3–3	Spare
SW3–4 ON	Refrigerant quantity check
OFF	Regular operation
SW3–5 ON	Check operation
OFF	Regular operation
SW3–6	Spare
SW3–7 ON	Forced cooling/heating
OFF	Regular operation

SW3–8	ON	Test mode
	OFF	Regular operation
SW4–1~4		Model setting
SW4–5		Demand
SW4–6		Demand
SW4–7		Address setting switch (master • slave)
SW4–8		Address setting switch (master • slave)
SW5–1	ON	Trial operation
	OFF	Regular operation
SW5–2	ON	Trial operation mode/cooling
	OFF	Trial operation mode/heating
SW5–3	ON	Pump down operation
	OFF	Regular operation
SW5–4		Spare
SW5–5	ON	Super Link communication
	OFF	Super Link II communication
SW5–6~8		Spare
SW6–1~3		Spare
SW6–4	ON	High head mode
	OFF	Regular operation
SW6–5~8		Spare
SW7		Data clear/insert
SW8		7seg indicate (unit's place)
SW9		7seg indicate (ten's place)

SW10	Reset
TB1,2	Terminal block
Tho–A	External air thermistor
Tho–C1,2	Under–dome thermistor
Tho–D1,2	Discharge pipe thermistor
Tho–H	Sub–cooling coil thermistor 2
Tho–P1,2	Power transistor thermistor
Tho–R1	Heat exchanger thermistor (exhaust)
Tho–R2	Heat exchanger thermistor (exhaust)
Tho–R3	Heat exchanger thermistor (inlet)
Tho–R4	Heat exchanger thermistor (inlet)
Tho–S	Suction pipe thermistor
Tho–SC	Sub–cooling coil thermistor 1
Va1~4	Varistor
20S	4way valve
52X1–1,2	Solenoid for CM1
52X2–1,2	Solenoid for CM2
63H1–1,2	High pressure switch (for protection)
7SEG1	7seg L.E.D. (function indication)
7SEG2	7seg L.E.D. (data indication)

PCB003Z588

VRF INVERTER MULTI-SYSTEM AIR CONDITIONERS

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Because of our policy of continuous improvement, we reserve the right to make changes in all specifications without notice.

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